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REPORT OF THE

Secretary of Agriculture

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FOREWORD

Production above all expectations was agriculture's answer in 1942 to the Food for Freedom call. From a crop acreage above that of 1941, and above the 10-year (1930–39) average, we harvested unprecedented yields per acre, the result of good growing weather and tremendous farm activity. Total food production (food crops plus total livestock) was about 10 percent above that of 1941; crop production was about 15 percent higher. Moreover, the production suited the need. It was not just any kind, but the kind we had to have, shaped that way through Nation-wide crop adjustments applied farm by farm.

Such crops as wheat, rice, commercial vegetables, fruits, and sugar approached or exceeded all past records. Numbers and production of farm livestock, exclusive of horses and mules, advanced to record heights; output of milk and eggs rose far above previous levels. Feed grains and also hay and forage gave larger supplies than ever before, and pastures were at their best since 1910. Expanded acreage of oilseed crops assured record production of vegetable oils and high-protein feed. Farmers had a marvelous production year, and would have attained a still greater crop production had the growing season not ended with exceptionally cold weather.

Yet the demand outstripped the supply. Reflecting military and lend-lease needs, as well as an exceptional civilian demand, the need seemed illimitable. Consumers could not buy as much of some foods as they would have liked to buy, and faced the prospect of further restrictions. Lend-lease purchases of meat alone passed the half-billion-dollar mark. United States military requirements made a heavy draft on the meat supply. The total meat demand could not be filled, though the year's meat production was the greatest in our history. Civilians had to share other food supplies with our armed forces and our allies. Unbelievably productive though it was, our agriculture was not equal to the full demand upon it.

Civilians will have to make further adjustments in their consumption habits. They will not go hungry; the nutrition value of the civilian food supply will be about the same as it was in the 1930's. Undoubtedly, however, civilians will not be able to

obtain their usual supplies of many items. Transportation will not be available for long hauls of some kinds of vegetables. Other products will be in shorter supply for civilians because we must make larger provision for our fighters and our allies. Moreover, we must provide ahead for countries that our arms will liberate. In any country we reoccupy, starvation must disappear. Civilians will be glad to make adjustments which they know will hasten victory.

In 1943 the gap between demand and supply may be wider. Military and lend-lease needs for food will be half again as great as they were in 1942; they will take about one-fifth of our total food production. This is an average figure. For many leading commodities, the combined needs of our fighting men and our allies will come higher. More than a quarter of our meat, for instance, a third of our lard production, nearly one-third of our eggs, and half of our output of canned vegetables will have military and lend-lease destinations.

Yet farm production equal to that of 1942 is probably the maximum for which we can plan. Total crop acreage will be about the same. We don't have the land resources for much further expansion. Goals will be larger, however, for some crops and also for livestock production than they were last year. For other crops the goals will be about the same; for still others, for example some vegetables, they will be smaller. Farmers will have to contend with greater obstacles, especially with worse shortages of labor and machinery; they will have to do with less fertilizer, insecticide material, bagging, and other means of production. It will be a miracle if the weather is as good for crops as it was in 1942.

But agriculture is not at the end of its resources. It can still shift acreage to the crops most needed and withdraw it from crops of which we have enough. Our farms are a long way yet from having every acre in the best war use. Nor have they gone to the limit as yet in the efficient use of manpower, machinery, and supplies, or in the use of agricultural science. War is a green light for all these things. Farmers can work with public agencies in obtaining and using hired labor more effectively. Through pooling arrangements they can save hauling, get more use from farm machines, and solve problems in crop harvesting and storing.

Still more important in stretching hard-pressed farm resources is the farmers' cooperation with their Government. They look to the Government for threefold aid: (1) In Nation-wide produc-

tion planning; (2) in mobilizing physical and technical farm facilities; and (3) in price stabilization through commodity loans, other price supports, and marketing controls. Farmers and Government officials have cooperated for a decade in fitting production to needs, but they have not exhausted the vein. We can count on them to explore it further in 1943.

Unity is developing on the food front. Bickering over the dollars and cents aspect of it and over group shares in the national income is giving way to broad acceptance of stabilization policies based on the Price Stabilization Act. National interests are prevailing over group interests and throwing group struggles into the discard. Farm and city people can give more attention now to the streamlining of the war effort, to the smooth and silent meshing of the gears, and to the proper synchronization of farm production with urban processing and distribution.

C. R. W.

CONTENTS

	Page
War work on the farm front	1
The role of food in modern war	13
Combined food strategy	19
Food dehydration	24
Program to prevent inflation	27
Farm prices and incomes	33
Farm price supports	36
Farm needs for machinery and other supplies	39
Fuel for farm traction	43
Pressure on storage	45
Sharing fertilizer materials	49
Farm labor supply	52
Lend-lease and other distributing operations	59
The year's production	64
Victory gardens	67
Cotton	70
Wheat in the war economy	72
Livestock and feed	75
Our dairy industry	80
Dairy research	82
Poultry and eggs	86
Fruits and vegetables	89
Sugar production and rationing	92
Tobacco	94
Rice	96
Fats and oils shortage	99
Goals for 1943	102
Europe's food	104
Agriculture in the Orient	108

Page

Cooperation with Latin America 110
Wartime foreign trade 115
War's impact on the Department 119
The AAA in the war effort 123
USDA War Boards 127
Extension services along the farm war front . . . 130
How the war is changing our farming systems . . 134
Farm production capacity 139
Hazard of land speculation 141
Activities of the Commodity Credit Corporation 145
Farm credit 147
Crop insurance 149
Rubber research and cultivation 151
Encouraging long-staple cotton production . . . 158
Fiber-plant studies 161
Shortages of drug plants 163
Locating war industries 165
Flood control through land work 168
Conservation in wartime 170
Land use planning 174
Services to the armed forces 177
Findings of experiment stations 179
Agricultural chemistry and engineering 183
Animal husbandry 189
Home economics 193
Entomology and plant quarantine 196
The war drain on our forests 199
Farm security programs 206
Rural electrification 210
Personnel administration 213
Civilian conservation camps 215
Post-war planning 217

REPORT OF THE

Secretary of Agriculture

1942

WASHINGTON, DECEMBER 1, 1942

To the President

War Work on the Farm Front

In the face of mounting difficulties, mostly the outgrowth of the war, our farmers produced another record output in 1942 for the fourth year in succession. Moreover, they produced it in about the form desired. They enlarged their marketings hugely in some lines, especially in dairy products, poultry, and meats, and at the same time held on to their breeding stock, milk cows, and laying hens. They increased their acreages of some crops, increased the amount and improved the quality of their feed supplies, kept brakes on in other lines, and harvested exceptional yields per acre. As a result we had supplies for our armed forces, for increased lend-lease exports, and for record civilian consumption in the United States.

The farm response to the war call, in short, was adequate for 1942; but it does not warrant any slackening. On the contrary, increased demands will oblige farmers to make a still greater effort, against yet greater difficulties, in 1943. They will be asked to produce a maximum output with reduced supplies of labor, machinery, fencing, fertilizer, insecticides, and container materials. What they did in 1942, and how they did it is therefore important not merely for the record but for the development of the farm war effort. It shows the collaboration needed among farmers, nonfarmers, and Government agencies. This report tells the story broadly, and also in some detail, so that the country may know what the teamwork involves. Wider knowledge of what the farmers are up against can be an offset to their handicaps.

Announced in January, the 1942 production goals were a sharp upward revision of goals tentatively formulated before Pearl Harbor. They represented the most difficult farm task in our history in that they sought a record output in an unusual form in the face of growing shortages of labor, machinery, fertilizer, and other means of produc-

tion. Every farm, every unit of farm manpower, every scrap of usable farm machinery, all the fertilizer available, and all the power of agricultural science had a role to play.

It was evident that some of the goals would be difficult to reach, especially the dairy goals and the goals for the oil crops. Farmers had to share labor and materials with industry and with the Army and Navy, change their crop patterns, experiment with unfamiliar crops, and struggle with difficulties in storage, transportation, and marketing. They accepted the challenge, buckled down to the job, and achieved a production above the goals in most lines though moderately below them in a few.

AGRICULTURE'S READINESS FOR THE WAR JOB

Outstanding among the assets which agriculture brought to its task was the reserve power it inherited from the 1930's, the years that saw the birth and early growth of our national farm program. Features of this program which had been adopted to reduce farm surpluses and raise farm prices were also, as it turned out, preparation for the war emergency. The acreage adjustments it promoted favored precisely the crops we now require. Commodity loans accumulated reserves in the Ever-Normal Granary. Soil conservation stored production capacity in the land. Contrary to a popular impression, the adjustment system was never a scarcity device; it merely reduced the output of things not needed for the sake of getting more production of things required. Our total farm production rose; it increased 10 percent between 1938 and 1940, and the increase was mainly in the commodities that help us now to win the war. The program enabled us to begin with large stocks of breadstuffs, meats, and fruits, with a record supply of feedstuffs, and with a record number of meat animals on farms and ranches.

In a word we did not have to begin from scratch. When Great Britain asked for more foodstuffs, when Russia needed some of our farm products, and when our own needs mounted we had the means to respond. Our stocks in the Ever-Normal Granary and our renovated soil gave us a head start which allowed us to increase our own food consumption and at the same time to be a food arsenal of democracy. Corn on hand became meats and dairy products quickly; wheat stocks became available as feed for livestock and also for the production of ethyl alcohol.

Also the program prepared farmers as well as farms for the ordeal of war. Farm prices sagged after Germany's early successes. Cash wheat at Kansas City, for example, dropped from 107 cents a bushel on May 13, 1940, to 79 cents on June 5, 1940. Hogs and other livestock dropped. Export outlets for wheat, cotton, and tobacco shrank to nothing. But commodity loans supported farm prices, tided farmers over, and brought them through with their finances as well as their land and crops in fair adjustment. The agricultural front was firm and ready to advance.

Thus agriculture was ready for the 1942 program. It had rehearsed for it in 1941, when the Government asked increased production for defense preparation and provision besides for lend-lease exports.

Farmers revised their production pattern drastically in 1941 in a Food for Freedom drive to match the industrial defense effort. They shifted from low to high gear, placed increased emphasis on livestock, poultry, dairy products, and vitamin-rich vegetables, and did preliminary planning for the year ahead. In short, they moved toward a war footing. Mainly, when the war engulfed us, farmers had simply to make an extra effort, with some change of emphasis, along lines already drawn.

AIMS AND ACHIEVEMENTS

New was the emphasis on the oil-bearing crops, our importations of which had dropped. In accordance with the war call for livestock and dairy products, the Department raised the corn goals and the corn-acreage allotments and announced there would be no marketing quotas on corn. Conversely, it urged continued restraint in the production of wheat, tobacco, and cotton, along with a shift in cotton toward the longer staple lengths. Familiar in its program was the Nation-wide crop-adjustment system, with its commodity loans, acreage allotments, marketing quotas, and Government payments. Adapted to the new conditions, this system functioned as before, with increased emphasis on the national welfare.

As a whole, the production goals for 1942 looked toward an increase of about 6 percent over the production of 1941, and of nearly 20 percent over the average annual production in the period 1935–39. Not counting cotton, wheat, and tobacco, of which crops we had large stocks on hand, the goals sought an increase of 25 percent over the 1935–39 average. In milk, the Department asked for 8 percent more production than in 1941, the previous all-time high year. In eggs the increase asked over 1941 production was 13 percent; in hogs 14 percent; in cattle and calves marketed for slaughter 8 percent; in sheep and lambs 2 percent; in chickens 10 percent; in peanuts 155 percent; in soybeans 54 percent; in flaxseed 34 percent; in dry field peas 73 percent. All-out production was the target in such lines as soybeans, peanuts for oil, and meat. Production up to processing capacity was the goal for canning peas, canning tomatoes, sugarcane, and sugar beets.

In food and feed production, with wheat not counted, the goals called for more than 6 percent over the production of 1941. This part of the assignment fell with special weight on the Corn Belt.

Estimates in October indicated the food and feed crop production, exclusive of wheat, might be as much as 14 percent above the level of the previous year. The October figure for all food (total food crops plus total livestock) is 10 percent above that for 1941. As a whole, both for food and nonfood production, the goals will be realized or slightly exceeded. Farmers had the advantage, to be sure, of very favorable weather, especially for corn and wheat. It appears now that the broad objectives for livestock production will be reached. Hog and cattle slaughter in 1942 should just about equal the goals, while sheep and lamb slaughter will exceed the goals by about 5 percent. Chicken production will just about equal the goals; egg production will exceed the goals by 2 percent or more. Milk production will fall short of the goal but will exceed the record production of 1941 by 4

percent. Nature compensated the farmers to some extent for the difficulty they had in getting labor, machinery, and other means of production. Even so, the achievement is remarkable and bears witness to agriculture's reserve power and elasticity.

PRODUCTION-CAPACITY ANALYSIS

It would have been desirable, had time allowed, to fit the goals more precisely to the potentialities of each region, area, and farm. But the essential thing was speed. Close consideration of different areas and farms, from the standpoint of their capacity to produce, had to be deferred. Farmers had to keep step with the seasons; they had to know in advance what they should plant. Launching of the goals campaign had to be done ahead of seeding and planting time, so that the USDA Defense Boards (now called War Boards) could break the goals down to a State, county, and area basis and start AAA county and community committeemen at once on the task of getting individual farm cooperation. As soon as possible, however, the Department began a Nation-wide productive-capacity analysis to serve as a basis for fitting the job more closely to the powers and limitations of different areas and farms. Goals for 1943 will be shaped to this analysis and therefore will correspond more closely than did those of 1942 to the regional and local variations in crop capacity.

This study of our farm production capacity had war needs in view, and highly specific ones at that, rather than vague general possibilities. First it considered the probable necessary change from 1942 in the goals. Change has been incessant in the requirements, as a result of military developments, altered relationships between military and civilian consumption, new technology in food processing, unforeseen price conditions, and shortages of labor, machinery, seed, fertilizers, and insecticides. Moreover, the goals must consider what the marketing system can take and distribute from the farms. Transportation, processing, and even finance have to be considered. Farmers must not be asked to produce what cannot be readily transported, processed, or if necessary, stored. In making the production-capacity analysis the Department held meetings in one representative county in each major type-of-farming area. Farmers as well as Federal and State technicians attended these meetings and helped to appraise the local factors.

Guiding and assisting farmers to produce the commodities required in the desired quantities and proportions is the war job of the Agricultural Adjustment Agency. It involves AAA contacts, through county and community committeemen, with individual farmers throughout the country, first to sign up the farmers for goal participation and then to help them achieve the goals. With their alternates, the AAA committeemen constitute a force of more than 150,000 agricultural leaders. They keep the farmers advised of program requirements and changes, take note of their wants in labor, machinery, and transportation, and check the individual performance.

Divided for war purposes into a production-adjustment and a production-practices part, the AAA program provides that in order to get his full AAA crop payment the cooperating farmer must meet his goals for all commodities. He has a 10-percent leeway, and also toler-

ance for unavoidable crop failure; but except for these allowances he must meet his pledge. The AAA job is to help him do so, through technical aid, arrangements that include price supports and money payments and collaboration with USDA County and State War Boards in efforts to see that necessary labor and equipment are available. Chairmen of the AAA County and State committees are also chairmen of the USDA County and State War Boards.

Cooperating with the AAA on the farm war front is the Farm Security Administration, which enables thousands of small farmers to share in the goals program. Emphasizing production of meat, milk, eggs, fruits, and vegetables for the war effort, the FSA helps underemployed, low-income farm families to buy tools, seed, cows, sows, and chickens. It aids them in other ways to participate in the farm war effort so that in increasing numbers they can qualify for AAA payments. It encourages them especially to increase their production for their own consumption, particularly of garden truck, pork, milk, and eggs. This is the equivalent of production directly for war uses, since it provides farm families with needed food that otherwise they would have to buy or go without. About one-fifth of the Nation's low-income farmers have been enabled already through FSA help to produce more for themselves and something for the market besides, and programs in the making will make still greater use of our underemployed agricultural land and labor.

With the farm-surplus problem changed into a farm-shortage problem for the duration and perhaps for considerably longer, the AAA and FSA are complementary means of promoting all-out Food for Freedom effort on all the Nation's farms.

DEMAND AHEAD OF SUPPLY

As in other lines of war production, the farm effort lags to some extent behind the vast demand. It is a battle every day, with potential shortage always just around the corner. Livestock men, for example, are responding well to the Food for Freedom call. Production of federally inspected meats was about 15 percent greater in the first half of 1942 than in the first half of 1941. Hog farmers made an almost unbelievable production record; this year's pig crop may give us 18 million more pigs than ever before. Yet consumers in several eastern areas have had trouble in getting the kinds of meat they desire. The Department urged limitation of meat consumption and OPA announced formal consumer rationing of meat would be started soon. The explanation, of course, is that the demand was prodigious, too. Housewives had more dollars to spend for meat than ever before, the lend-lease demand was heavy, and purchases for the Army and Navy were at record levels. The Department took steps to ease the pinch. First it temporarily reduced the lend-lease buying; second, it went below Office of Price Administration ceilings for the lend-lease purchases which it continued; third, it offered agreements with packers which would allow them to process meats for the Government on a contract basis. This plan, though powerless to enlarge the total livestock supply, promised help to some hard-pressed processors and tended to keep them in business and ready for an expected record fall

slaughter. The incident, though minor in the total farm effort, typifies the difficulties. It is one thing in wartime to provide for necessary wants and another thing entirely to satisfy every demand. That, indeed, cannot be done.

NEED OF FOOD CONSERVATION

As a nation we are still too complacent about food. The only way we can provide enough food to win the war is to conserve this year's great production and make greater future efforts in the production, processing, and distribution of essential foods. The Foods Requirements Committee, an interagency body created June 5, 1942, with the Secretary of Agriculture as chairman, made a study of how to best use our meat supply, and concluded that a limitation order is necessary. The OPA issued the order, which specified how much beef, veal, pork, lamb, and mutton meat packers can put on the civilian market. If all meat produced this year were to be used by American civilians, we would have the biggest supply ever known. But civilians must share it with the Army and Navy and with our allies.

As result of the Government's farm program, with its price supports, our potential meat supply exceeds anything ever recorded; but the need for American meat also far exceeds anything ever recorded. The demand is much greater than the supply. Everyone should learn why the meat limitation order is necessary, why the share-the-meat program followed by rationing is advisable, and how it can be carried out. We may have to revise some of our ideas about supplies of food available to consumers in the next few months, even of the foods which we appear to have in comfortable qauntities. We must begin at once to hold back. The time to conserve food is while we still have something to conserve. Food can be one of our strongest weapons if we use it with full effectiveness.

Estimates of the food requirement continued to expand during the year. Men in the armed forces eat more than do civilians, especially of animal products; and the armed forces of the United States became more numerous from week to week. Civilian food consumption increased with consumer buying power. It affected particularly the animal products and the vitamin-rich fruits and vegetables, in higher demand also for Army and Navy use and for lend-lease export. In energy or calorie value the civilian food demand rose less. There was a constantly larger United Nations food call to consider. In May and June, for example, the daily average of the purchases by the Agricultural Market Administration for lend-lease and other purposes exceeded $5,000,000, as compared with an average of about $3,000,000 a day in the first 15½ months of lend-lease operations. Shipping was the principal lend-lease bottleneck; the requirement was far above the shipping power.

This country, closer to its European allies than any other big source of food they have, can convoy ships on the Atlantic. The convoys are getting through. But we do not have as many ships as we need, and cannot provide our allies with all the food we would like to send them. The Combined Food Board of the British and the United States Governments, which maps food strategy for the

United Nations, wants to encourage the production of food in areas near where it will be used. It hopes especially that Britain and Russia will produce all they can. But the British have not been self-sufficient in foods for a long time, and Russia has lost much food-producing territory. So our responsibility increases and requires more production than we can immediately ship. It requires reserves that can be sent as ships become available, and preparation for exports later to countries now under Axis domination. We cannot yet ship bulky products, such as wheat and corn, in large quantities, but the export demand for our grains may be large when the war ends.

ALLOCATING SCARCE FARM FOODS

The change-over from peace to war shapes the agricultural effort mainly in terms of war needs, rather than in terms of markets or of production costs. In essential items that are in short supply we must have additional or substitute production. Our agriculture adjusted itself readily enough to the war before we got into it ourselves. The adjustment now is very difficult. Our stepped-up farm production, though more than adequate for normal wants, is not sufficient for war needs and wartime boom demands too. Hence production boosting is only part of the change-over. Side by side with it, and equally important, is the task of allocating scarce farm goods among the different military and civilian requirements at home and abroad. The strategic distribution of supplies, the sending of them to the places where they will do the most to win the war, is as necessary to the war effort as skill and promptness in getting the supplies produced.

This we should keep in mind for a special reason. In most countries privation results unavoidably from the war; they simply do not have and cannot get enough supplies. Here the situation is entirely different. What we sacrifice to win the war we sacrifice largely from choice. Few agricultural products would be scarce in the United States if we insisted on having them, if we thought only of our wants and not of our responsibilities. We could use our ships to bring in sugar, coffee, bananas, cocoa, fruits, and many other commodities that normally we import heavily. But we could not use the same ships at the same time to transport men, munitions, and foods to the battle fronts. Essential therefore to a wise allocation of our agricultural supplies is a constant awareness of the purpose, which, of course, is to win the war rather than to obviate temporary inconvenience.

Let us not forget, moreover, that we can stand considerable cutting down in our civilian use of farm commodities and still have more and better food to eat than the people of any other country. Our national dietary is better under war conditions than that of the British; vastly better than that of the Russians; and infinitely above the starvation levels that Nazi rule has imposed on Poland, Greece, Norway, the Netherlands, France, and parts of the Soviet Union. Some packaged products that are essential to the armed forces, for example canned meat, are not essential to the diets of our civilians. It is not a hardship for our civilians to reduce their consumption of such

items. Actually, moreover, we have a reservoir of farm products, namely, the supplies that ordinarily we waste, such as the excess fat on beef and pork cuts, the stale baked goods, the left-overs, and the slightly used clothing. Much more sacrifice than we make as yet would not cut seriously into our nutrition or put us on a par with our allies in privation.

Many people, especially farmers who have experienced overproduction, cannot believe that the agricultural surplus problem has given place to the shortage problem as broadly as the figures show. They dread a sudden switch-back to the old familiar glut. This cannot happen. Chiefly responsible for the change is an increased demand for American consumption, both civilian and military. Full employment in this country, along with the extra strain of war work, increases the food demand of almost every worker family. Longer pay rolls, at higher wage rates, give workers the means of satisfying their wants. Estimates for military consumption are, of course, unavailable; they might betray military secrets. But the military food demand, for the Army, the Navy, the Air Force, and the auxiliary forces, is prodigious. Then there is the growing lend-lease task.

It should be borne in mind too that United States farmers have to fill big wants created by our loss of imports. This includes not merely food imports. In the fiscal year 1936, our imports of farm products exceeded a billion dollars in value. Besides food items, such as sugar, bananas, cocoa, tapioca, coffee, tea, and even feedstuffs in small quantities, the imports included wool, rubber, silk, hard fibers, jute, drugs, drying oils, and many other products. In 1937, when our grain stocks were low, the imports included quantities of feeds and fodder and of wheat required to supplement our own reduced high-protein wheat supply. Our customary imports have since dropped greatly. The war in the Pacific, combined with the scarcity of ocean shipping, is the chief impediment and calls for heavy similar or substitute production here. Especially acute is the shortage of imported fats and oils. Our production of lard, tallow, greases, peanut oil, soybean oil, and cottonseed oil must be expanded greatly.

OBSTACLES IN THE FARM WAR EFFORT

What of the difficulties? They include shortages of farm labor, farm machinery, fertilizer and insecticides, and other means of production. Problems of storage and transportation, especially highway transportation on rubber, are serious. Later sections of this report give details of these shortages and describe efforts made to deal with them. Agriculture has to share a dwindling supply of labor and strategic materials with industry and with the armed forces. It cannot possibly get enough for all it has to do.

The Army and Navy take millions of men. War industries attract labor with wages above what the farms can offer. Metals are scarce for farm-machinery repairs, not to speak of new farm machinery; fertilizer materials must be shared with the makers of explosives. Farmers regard these drawbacks as a challenge. They agree that the country rightly puts guns above tractors, and explosives above

fertilizer. They make do with less than they could use, so that our fighters may have weapons. But the difficulties remain.

For example, migrant workers that farmers have depended on heretofore are not following the crops as they did. They used to transport themselves in their old cars. Now these cars are breaking down, and the tires are wearing out. Thus the labor of these people becomes unavailable to farmers. The railroads have announced lower fares for labor, but that is not enough. Plans have been arranged for the Government to pay transportation expenses of farm workers and to set up more camps to house them near the places where they work. Means have been made available temporarily from the President's emergency fund. Frequently, however, the only way for farmers to move in help is to pay the transportation cost themselves.

Aiming the farm labor supply at proper crop objectives saves farm labor. This is largely a Federal task. It reduces waste of manpower in growing and handling surpluses. Overworked fields, granaries, transportation channels, and marketing facilities tax the labor supply throughout the whole economy. Moreover, the overloading squanders stored labor embodied in elevator capacity, rolling stock, terminal warehouses, crop-conditioning apparatus, and other things; also, it burdens our financial machinery, which likewise uses manpower. The Department attacks this problem as part of the production-guidance job, in a broad effort to prevent waste of money, manpower, machinery, and land.

Actually surpluses waste human energy as long as they exist. Looking after them is a manpower job, which occupies great numbers of people. Storing crops for which there is no demand requires facilities which the country must provide at a heavy cost in human work. Moreover, prolonged excessive storage builds up explosive situations which, in turn, divert manpower from constructive ends. Handling the farm-labor situation calls, among other things, for strict attention to the purposes of production, so that the labor available will produce things we need rather than things that make useless added work. This is a first-rank duty in wartime agricultural planning.

It takes considerably more manpower to produce meats, dairy products, and the protective foods than it does to produce an equivalent energy value in grains. But we cannot economize labor there. Fighters and workers have need for the foods that are relatively high in labor cost. So we must look elsewhere for chances to save the labor supply. Along with the effort to refrain from producing, transporting, and storing crops not in urgent need, we must adopt intensive labor-saving methods in processing, handling, and shipping necessary production.

SAVING CARGO SPACE

Meats, eggs, and dairy products must be compressed, so that every cargo will have maximum food value. Processors, with the aid of science, have learned much about food concentration in the last 12 months, with the result that each ton of food in current lend-lease shipments represents much more food value than the average ton

did in 1941. Temporarily, indeed, this progress can create embarrassments, as happened from the sudden lend-lease change from principally evaporated to principally dried milk. It saves enormously on balance, however, particularly in the labor cost of producing storage facilities, railway rolling stock, and ocean shipping space.

This Department has cooperated with processors in establishing a new spray process for milk drying. It has helped also with improved methods for drying eggs, vegetables, and meats. Eggs have been prominent in the British lend-lease requirements, and at first the British asked for shell eggs. But shell eggs take up much shipping space and need refrigeration; so now we are sending dehydrated eggs. It is possible by the latest methods to pack the food value of a dozen fresh eggs in a small 5-ounce container. In fruits, vegetables, and soups new dehydration processes are the answer to many shipping problems. New methods with great possibilities have been developed in the dehydration of meats. Sending ordinary canned meats to our allies and our soldiers requires much tin and much cargo room. The dehydrated product will keep and is only about one-third as heavy and bulky as fresh meat, and experiments are under way to find something else than tin to pack it in. The dehydration of lend-lease foods will release merchant and naval shipping, and economize labor and materials in other food-handling facilities.

HOW THE GOVERNMENT HELPS

The Department has assisted the farmers with technical advice, commodity loans and price supports, and detailed program guidance State by State, county by county, and farm by farm. It has presented their claims for labor and supplies to the proper authorities, though with full awareness of the industrial counterclaims. Technical advice to the farmers, perhaps the Department's most basic responsibility, has taken on new importance, as a means of aiding farm operators to shift from old to unfamiliar crops. Agriculture has to make itself over, and the change poses a host of technical problems, study of which brings technicians and farmers into closer and more frequent contacts than ever before. New policies with regard to loans, purchases, and sales of Government-held stocks are part of the farm program, and take form in definite price-support announcements. Proper guidance in the field draws on the USDA State and county War Boards, the spearhead of field cooperation, and on AAA committees in every county, with the Extension Service serving in an educational campaign. The Extension Service has organized and trained neighborhood leaders in rural areas throughout the country and developed facilities for quickly reaching almost every farm with program information.

Other important developments of the year included the guayule rubber production project, launched on March 8; the development of a short and economical process for making butylene glycol at the Department's Northern Regional Research Laboratory, at Peoria, Ill.; adoption of a program, announced in May, to enable canners to operate at maximum production, vegetable growers to produce at capacity, and

consumers to obtain canned vegetables at controlled prices; the Victory Food Special program, also announced in May; various programs to facilitate dehydration of farm products; establishment in June of a Foods Requirements Committee, with the Secretary of Agriculture as the Chairman and with the special duty of handling the food problem in close cooperation with other complicated war-production problems; announcement by the Department in July of a three-point program to alleviate the meat shortage; announcement subsequently of a voluntary meat-conservation program as the precursor of a rationing program; announcement in August of a program of Government aid in supplying farm labor through the cooperation of this Department with the Manpower Commission and other war agencies; announcement in August of a pricing, marketing, and processing program for oil crops; announcement in September of temporary orders with regard to the sale of new farm machinery and equipment, along with delegation by the Office of Price Administration to this Department of authority to ration such machinery and equipment; and the approval on October 2 of the Price Stabilization Act.

AFTER A YEAR OF WAR PARTICIPATION

As the United States enters the twelfth month of its participation in the war it is possible to make certain general statements about the agricultural position of the United Nations.

So far as production is concerned, the United Nations will be able to meet most of their essential requirements in food and fiber. In some few cases, notably rubber, supplies will be forthcoming only for the most essential military needs, with little or nothing left over for civilian use; but in these cases there are programs of increasing production, either of the natural commodities or chemical substitutes, which will gradually increase the supplies available.

There will be only a few items of food which are actually in short supply. Most of these are items which are not essential for normal civilian feeding and which are allocated for use by the armed forces or for civilians in war zones.

However, there will undoubtedly be many deficits, some of them severe, due to the limited shipping facilities available to the United Nations. These deficits will mean somewhat less varied diets in such countries as the United Kingdom, Australia, and the Americas, but if present shipping capacity is at least maintained, there will be enough to eat. Elsewhere, where problems of transportation are more difficult, there is serious danger of widespread malnutrition.

In looking toward 1943 we may find that more than a simple announcement of price supports will be necessary to maintain the output and keep it properly composed. Acreage allotments can help to restrain farmers from producing more wheat, cotton, and tobacco than we need. Acreage available for crops in the Corn Belt is, of course, relatively limited. Farmers there must choose among alternative crops. More corn and feed grains will mean less soybeans, less hay, and less pasture. Conversely, more soybeans, forage, and pasture production will interfere with efforts to build up as large a corn acreage and corn production as might be desirable. Our acreage adjustment

system has flexibility enough to make it a very effective aid to the price supports in getting the kinds of production we want.

Small farmers will probably become more important in the total production effort. Opinions vary widely as to what the ordinary low-income farmer can accomplish. This Department recognizes that the increases in production which can be obtained from the low-income farms in a short period of time do not compare with the increases that can be got from the commercial farms. Nevertheless, the farm labor situation will become more difficult. It will put a premium on efforts to use the reservoir of unused farm labor which the small farms have. If the war should last for several years the small farmers might become a far more important factor in the agricultural effort than most people think. The Farm Security Administration has suggested a program with a dual purpose: First, to help some small farmers find other employment; and second, to regroup the released resources for better operation. As shown in more detail later in this report, the opportunities for this kind of readjustment are considerable.

In general, we shall want to keep our agricultural production undiminished in 1943, and in some commodities increased. This will be difficult. Farmers have had the advantage this year of excellent weather and of relatively better labor and machinery supplies than they are likely to have next year. Achieving the goals for 1943 will call for closer matching of them regionally and locally with production capacity and for new drafts on all potentialities for raising the level of farm efficiency. More attention will have to be given to other means than price supports for maintaining or increasing the agricultural output. This is a corollary of the rule that production must be maintained without inflationary procedures. The only way to stablize the cost of living and slow down the inflationary drift is to prevent price advances for particular commodities, both agricultural and industrial, and at the same time to stabilize wages, profits, and other incomes throughout the country. In proportion as the price stabilization succeeds, the importance of other means to encourage production desirably will increase.

Briefly, we shall need to revise all our operating programs so that each will contribute fully to the general goal. Especially necessary will be more efficiency, through broad social cooperation, in distributing labor and machinery. Through a farm-machinery rationing system a limited supply of new machinery and equipment will be released to farmers. It will be necessary to make this supply of machinery meet the most critical needs of our wartime farm production program. For fertilizer and other production supplies it will be essential to get priorities for agriculture or to find ways of enabling farmers to get along with what they have. Farm price supports will continue to be important; but we shall have to use them along with many other devices, some of which may be entirely new. Achieving a farm record in 1943 as good as that of 1942 will call, in short, for fuller use than ever before of our organizing ability and technical skill. Patriotism rather than profit must be the main incentive.

The Role of Food in Modern War

The food-supply service of a nation at war is an inseparable part of the warfare, and the food itself is a physical weapon. As with firearms, superiority with the food weapon comes to a climax in battle. The soldier's firearm sets his maximum rate of fire at a given moment; his body power, which he draws from his food, determines the rate of fire he can actually draw from his firearm, and the length of time he can shoot and shoot straight.

Unlike firearms, food works ceaselessly as a war power. Well-fed soldiers remain healthier and recover sooner from fatigue and wounds; they can fight oftener and throughout a longer period. Good feeding of civilians increases the rate of civilian work in making fighting machines and enlarges the combatant proportion of the Nation's manpower.

War always brings vexations to those who supply foodstuffs and foods. Farmers run short of fertilizer; exporters lose customers; canners cannot get tin, and so on. But public policy should not act as if the removal of such vexations were the only war food problem. It should aim chiefly to raise food superiority and use it against the enemy. This action can deal with the troubles of individual producers, but it should do so as a part of the war campaign rather than to rescue business as usual.

This Department began work on the basic food problem before we became engaged ourselves in the war. Specifically it endeavored to increase the Nation's fighting power, and that of its friends, by helping farmers to produce goods that can be turned into fighting power, in other words, farm products needed at once, either by soldiers or by civilians, in preference to things in less urgent demand. It subdivided the job into farm-size and industry-size portions so that each participant could cooperate more effectively. This action built food superiority, which now we can turn against the foe. It included attention to the troubles of individual producers, both on farms and in the channels of processing and distribution; the object was defense and subsequently victory—not business as usual. Policies had to be weighed in the military scale, which values only what helps to destroy the enemy—only the balance of casualties is important in the end. On one side are the maintenance and restoration of the Nation's own men and those of its allies; on the other side enemy losses and impairments. Now that we are deep in the war our food policy must answer still more strictly to this accounting.

STAGES IN FOOD PRODUCTION

Contrary to the popular belief, farmers chiefly produce the raw materials of food rather than the finished article. Save for what

they grow for their own tables, farmers produce almost no food. They produce the raw materials of food, which others must transform into eatables. The fat steer which the farmer delivers at a railroad loading pen is not food; but a bowl of broth from that steer before a child at mealtime is food; so also is a chunk of corned beef from that steer when it feeds a soldier in a tank in hot pursuit of an enemy. Between the origin of the raw material on the farm and the final meal is an intricate sequence of sales, transportation, processing, packing, and storing. Then come cooking and serving, also parts of food production. These jobs must go through on schedule. They take far more work in the aggregate than that done on the farm, and under present conditions the nonfarm parts of the job give the most trouble. Matching farm efficiency with equal efficiency at all later stages of food production is a difficult operation.

Between a fourth and a third of the work involved in producing food is normally housework or its equivalent. It includes shopping for foods, preparing, cooking, and serving foods, garbage disposal, and dishwashing. In wartime much of this work has to be done wholesale at supply depots, in Army camps, and on ships; but it is the same old housework and absorbs a vast amount of human working power, the ultimate scarce resource. Food services use manpower in large quantities at every stage from the soil to the table in home or in camp. They should not waste it. Machinery and labor not available for munitions work must replace farmers and farm hands drafted. But there is another side to the problem. It is not good war economy to stint the food services of manpower. This may only shift the food job around, without cutting down its total manpower requirement at all. Withdrawing food makers from households, for example, may necessitate an increase in the working force of bakeries and canneries, along with increased production of baking and canning equipment. Sometimes it is hard to tell whether such a transfer saves or does not save labor.

This culinary-labor question has vast importance in an overseas army. Sending trained soldiers overseas to peel potatoes, if the potatoes can be peeled here, is not good management. Every food preparation that can be completed before the product goes into a ship cargo saves soldier time overseas and reduces the cooking equipment and cooking supplies necessary there. Every such saving lessens the clogging of roads by supply trains, and reduces the labor of dragging equipment through snow and mud and sandstorm and gunfire. All such savings may mean casualties saved for us and casualties inflicted on the enemy.

Our food-supply service in peacetime starts with crop planting and continues with tilling, harvesting, animal tending, marketing, and manufacturing. We take delivery, cooking, and service for granted. But in wartime these are big factors. What can we deliver in wartime, in what form, in what packages, by what carriers, when, and where? Some deliveries have to make the last stage by parachute, or on the back of a laboring soldier, or at night in a submarine running to a blockaded beachhead force. The delivery problems must be foreseen. Then we can work backward intelli-

gently along the production chain through warehousing, processing, and trading, and to farming and the land.

ELIMINATING EXCESS WATER IN FOODS

For example, we have long had a great military advantage in growing meat and eggs and fruits and vegetables, offset to some extent by difficulty in getting them delivered. In their natural form these products all carry a large proportion of useless water. Canned potatoes and some other vegetables even require added water to prevent mashing of the product in the can. Nutrition scientists and food engineers have largely overcome this delivery problem. By improving food dehydration they have recently made the greatest single improvement ever made in food as a weapon.

Many dehydrated foods have stood the triple tests of laboratory science, soldier acceptance, and military experience. A modern dehydration plant will throw off a weight of useless water daily far in excess of the weight of all metals in the plant. A carload of dehydrated onions shipped from California to New York will save 54,000 car-miles which would otherwise be necessary in handling the useless water in fresh onions. The metal necessary for dehydration to save 1,000 shiploads in 2 years is less than half of the metal required to build 1 ship.

Today British soldiers are eating Idaho potatoes in North Africa. They come in cans of precious tin. Not only are these potatoes saturated with water, but the spaces between them are filled with water. Thirteen tons of them contain about 12 tons of Idaho water hauled 3,000 miles by rail and 5,000 miles by ship under naval and air escort. The water may be better than African water, but the difference is not worth the ship risk. Excellent dehydrated potatoes could be substituted. In the turn-and-turn-about movement of the African battle front dehydrated potatoes in fiber can be readily destroyed to prevent capture, whereas canned potatoes are hard to destroy. Similar advantages are open to us in meats, milk, eggs, vegetables, and fruits, which can be compressed for overseas shipment. These are the foods best suited to sustain the soldier's health. They are also the quick-repairing, muscle-building foods necessary to build up reserves for battle endurance.

True, our enemies can use dehydration and related processes; but relatively they have only small amounts of the appropriate foodstuffs. Hence the net advantage, ton for ton, is heavily with us; for we have most of the best foods, and we save most on the longest and the lengthening supply lines. Food blockades which we maintain will eventually throw our enemies back upon a diminishing base. Their food balance in proteins, vitamins, and fats will be wrecked, and the manpower they will have to devote to food production will deplete their industrial and armed forces. Meantime, the United Nations, with their vastly larger supplies of dehydratable and other products, will be steadily building their fighting power on the actual fighting fronts.

War reminds us of technological food problems that in peacetime we ignore. We are now delivering foodstuffs to our armed services

in combat areas in all oceans, on three continents, and at innumerable islands. Lend-lease deliveries, also under enemy fire, cover a still greater range. Concentrations of our encamped forces congest facilities at home; for the camps are "mushroom growth," with which food-handling services do not easily keep pace. New munition works require enormous changes in the aggregate in the form, content, and timing of deliveries, and the rest of the civilian population feels the effect.

WHAT FIGHTERS NEED

Soldiers, it is well to remember, use more animal products in their diets than do civilians. The men of our armed services are drawn with near uniformity from all walks of life, but the Army's food per man per day departs strikingly from the population average. For example, beef consumption runs to 2.6 times the general per capita average. The United States Army diet (May–October 1942) exceeded the Department of Agriculture's moderate-cost diet for very active men by only 10 percent in calories. But in weight of animal products other than fats the Army's diet shows a 46 percent excess.

Finding out how to pack much nourishment in little space is therefore of vital military importance, especially for an overseas army, since overseas supplies are subject to sinkings, spoilage, and battle losses. Concentrated nourishment has equal importance in the lend-lease program, which ranks fats, meats and eggs, and dehydrated fruits and vegetables above the crude items like wheat or flour and corn. It takes more manpower to produce and deliver animal proteins and the protective foods, than to produce and deliver an equivalent energy value in grains. But fighters and workers need what the foods higher in labor cost contain, and their appetites are a good guide to food policy.

Soldiers in battle carry a heavy load of arms and ammunition, and use much body fuel in their rushes and dives for cover. For sudden spurts and also for the strain of prolonged battle and even trench holding only the best foods will do. Sports like football, wrestling, boxing, bicycle racing, and tennis use training diets; and these sports are mild compared with battle. Soldiers in battle can and do burn their own tissues; but the best prebattle feeding cannot stretch battle endurance indefinitely. Hence soldiers must have foods that are light and compact enough to carry and that can supply energy quickly. Also they must have compact foods that can be readily brought up to the front lines. Many an advance could be turned into route of the enemy if the winning troops could have food brought up. Many retreats end in surrender because food caches have not been laid behind the lines. In wars of position, a break-through may carry far beyond its expected objective if the retreating troops cannot destroy their food stores. We have battle foods better than those of the last war. But to realize the full advantage we must manufacture and deliver them to our own soldiers and to the armed services of our allies. As yet we are not doing a 100-percent job. Providing such foods is largely up to the processing industries.

THE CIVILIAN DEMAND

Civilian demand for food at home is rising. But in aggregate energy value the change, so far, is not impressive. More significant is the demand for certain kinds of food, especially the animal proteins and the vitamin-rich fruits and vegetables. This reflects the universal urge of human appetites, which appears to be nutritionally sound. People with higher and steadier incomes than they had in peacetime, and with exacting war-production jobs, try to lift the working power of their diets to correspond with their harder work. They use more of what it takes to produce that effect. Civilians under present conditions eat more meats, dairy products, poultry products, fruits, and vegetables than most people do in peacetime.

Such foods all require great manpower for their production. Crude foods like grains and sugar, in proportion to their work cost, have much more energy value. In their original forms, moreover, the animal proteins and the protective foods all are highly perishable, and they all carry a large useless water content. Dairy products, beef, and mutton are subject to the long life cycles and slow rates of multiplication of animals. Moreover, the animal products require the production previously of a feed crop. Fruits have the longest life cycles. Vegetables and fruits must be handled promptly and skillfully during a short, sharp harvesting peak. Hence there seems to be a case against the foods in which the bulges of demand have shown. They seem uneconomical in wartime. But the use results of the meats, dairy products, poultry and eggs, and of the fruits and vegetables, offset their higher manpower cost.

Dairy products, poultry products, meats, and fruits, all carry mineral salts and vitamins far in excess of the per-pound average requirements for growth and health and endurance. Mixed in the diet with inert foods like the sugars and starches, these foods make available the energy values in the sugars and starches, which in themselves are deficient in salts and do not contain enough vitamins for their own complete digestion. Hence the energy values produced by the animal proteins and the protective foods are greater than their calorie count. The foods we now send to Britain are chosen largely for their diet-balancing effects.

Our civilian food supply poses problems. On the average, the munition workers rank below soldiers in physical fitness, and future enrollments in the industrial army will be inferior to those now employed. Good food can improve their health and vigor and consequently their working power.

Good and sufficient food keeps up the other essential services of our war economy. The more efficient their personnel, the larger the manpower they release for arms making and arms bearing. Food is a weapon because it is a human fuel, and human muscle will do little work on poor fuel. Good fuel is as necessary to get speed and endurance out of human muscle as high-octane gasoline is to get action out of a fighter plane. The warfare values of food exist far from the battle fronts. They should reach the entire population, clear through to the dependent groups—to all younger children, to the oldest people,

to the infirm—and to those who care for dependents and run households.

Proper feeding of these people is not a liability but an asset to the Nation. It gives fighters and workers relief from anxiety about their dependents and strengthens their patriotic spirit. Moreover, adequate feeding of the dependent population saves money that would have to be spent otherwise to pay for malnutrition. It saves doctor and hospital bills, promotes the public health, lessens child delinquency, lessens crime, develops the young in usefulness and prevents the growth of disaffection. The charge for dependency is socially inescapable. Good feeding of dependent people keeps it down. Good human feeding at this as well as at other points lessens battle casualties.

Combined Food Strategy

Already we have learned not to take our food supply for granted as we do in peacetime. It has become clear to us all that we cannot have too much for the demands of war, and that providing enough requires tremendous efforts in both town and country, along with conservation and rationing. Food ranks with ships, planes, and guns as a military power, and must go with them to the battle fronts. It must also be on hand behind our battle lines, as a means of keeping the areas that we win—of consolidating our victories through swift relief of famine. But other peacetime views of food persist though some of them should not, notably the idea that the farmer is the only food producer or at any rate the chief one. Actually, the farmer does only part of the job; the rest of it involves practically the entire economy, especially its handling, processing, and transportation aspects. Forgetfulness of this is a handicap, because social teamwork is as useful in turning crops into food as it is in getting crops grown.

Even in peacetime the food job goes better if the doers realize it is a thing of many parts. This realization is still more important now, because the coordination is not automatic any longer but has become a complex administrative task, extended over the whole vast process from the farm to the military mess kit and the civilian table. It is a seamless web, which must not break at any point. It binds together the farms, the manpower to work them, the provision of necessary farm implements and supplies, the movement of products to concentration points, the equipment and operation of food product factories, the application of science and invention to save labor and materials and turn out better goods, and finally distribution through military, lend-lease, and civilian channels. Central in the task is the estimating of requirements. This involves global as well as national judgments, based on countless details of military, economic, and political interdependence, among them the requirements of economic warfare. There is importing as well as exporting to do, with care to see that the Axis does not benefit. The work is all of a piece and requires unified command.

SYNCHRONIZING FOOD JOB

Various procedures in 1942 brought food production, food processing, and food distributing together as triple aspects of a single job. Especially noteworthy was the advance achieved in synchronizing food processing with food production. Food processors tackled staggering problems in handling acceleratd farm productieon. They developed improved methods of concentrating and packing goods, accomplished miracles in dehydration, and developed new container materials. Meat packers squeezed additional utility out of the ex-

isting equipment and found new uses for some of it. Crackerjack makers used some of their equipment for packaging dried eggs. As shipping space became more restricted, processors cooperated more closely with transportation agencies. Careful planning shortened the time required in loading and unloading cars, and facilitated heavier loading of both carload and less-than-carload lots.

Shell eggs gave way to dried egg powder for lend-lease shipment. Dry powdered milk partly supplanted evaporated milk. Production of these dehydrated foods, and also of dehydrated vegetables, and even meat, will be vastly larger in 1943. A large kraut-cabbage crop was in danger of going to waste for lack of tin. Kraut packers, at the request of the Department, packed kraut in wooden containers. The changed composition of the farm output posed problems which processors met with extraordinary skill and promptness. Certain difficulties got into the newspapers, but for the most part the food-processing job went smoothly. Tight spots reflected the tremendous burden of production rather than any want of adaptability in the food-processing machinery.

In most lines food processors had unused capacity. But they could not rely long on that. They soon ran out of slack and had to provide additional facilities to the extent that the availability of scarce materials allowed. They changed some of their equipment to new uses—from ordinary canning, for example, to dehydration in some cases. Adaptation of processing plant and methods to wartime uses required some changes in most factories and drastic changes in many. Applied technology, new and old, stretched the efficiency of used and latent plant capacity, notably in the processing of dairy products, vegetables, eggs, and meats.

As a result, some bottlenecks that had been anticipated did not develop. Meat packing, for example, kept up with unprecedented marketings of cattle, calves, lambs, and hogs in spite of the fact that an increased proportion of the meat supply had to be canned and cured. Wider application of rapid-curing methods increased the output of the plants. Oilseed-crushing needs did not overwhelm the crushers; it proved possible either to move oilseeds to the crushers or move crusher capacity to the seeds. Some local congestions developed, for example in the production of tomatoes for canning, but these were a result of an occasional want of coordination between grower action and local plant capacity. By and large, the food-processing industry measured up to its responsibilities, though it had comparatively small chance to expand its plant and considerable difficulty in getting metals and other materials even for maintenance and replacements.

Special ingenuity was necessary to improvise container materials. Tin was extremely scarce, since we produce none in the United States; even the steel required for so-called tin cans was hard to get. This was a formidable hurdle. Glass is not a general substitute for tin, because it is bulky and breakable, and also requires metal tops and rubber gaskets; nor of course is wood. Even dehydrated foods pack best in tin for certain purposes. Burlap, which has wide uses in food packing as well as in packing nonfood products such as cotton, was practically unobtainable, and the shortage forced a resort to paper, cotton,

and wood in scores of unaccustomed uses. Paper got a try-out in bags for flour, potatoes, and onions; cotton provided bales for itself; wood did more container service than previously.

Processors had to stop such wasteful practices as the use of refrigerator cars for cold storage and ripening warehouses. Millers and grain handlers could not store grain in railroad cars. Scarcity of container materials, of storage room, and sometimes of shipping facilities was a general handicap; yet no serious halts developed in the processing industries, though products poured in on them ceaselessly from new as well as old sources. One serious difficulty was not in the factories at all. It was in truck transportation, which could not offset the growing shortage of tires. Processors got some relief from this difficulty toward the end of the year when the Office of Defense Transportation required truck registration, and truckers did more pooling of routes.

RESPONSIBILITY OF UNITED NATIONS

In its current phases, the food job is a responsibility of the entire group of the United Nations, rather than of any of them separately. True, the bulk of the load is on the United States; this country has the greatest food resources and the shortest routes to many battle fronts. But each of the United Nations contributes what it can in supplies, ships, and services; frequently the contribution includes materials for producing food as well as food itself. For example, the Combined Foods Board arranges for the production of vegetable seeds to supply Russia, China, and England. Briefly, the United Nations are pooling their food resources, drawing upon them so as to save shipping, and building stock piles in various convenient places. Understanding the wartime food job takes us beyond the farm, and beyond the confines of this country and this continent.

Basic in the strategy is economic analysis of military and civilian needs, our own and those of the other allied nations. The Foods Requirements Committee of the War Production Board schedules the total requirements, and the resources in the United States for meeting them. Agencies responsible for meeting different food requirements tell the Foods Requirements Committee what they want, and the committee makes recommendations as to what can be allocated to them. Besides Army and Navy, lend-lease, and United States civilian wants, it considers export operations under the Board of Economic Warfare. In estimating what the United States can provide it considers acreage and livestock possibilities; calculates supplies of scarce critical materials such as metals, chemicals, and wood that can be made available to agriculture and to processing plants; figures processing capacity, since it is useless to produce what cannot be processed; looks into storage and transportation by sea and land; and ascertains what the farmers require in machinery, fertilizer, and labor.

Findings are guidance for processors, transportation companies, and distributors. Taking the pulse of the market is almost useless now; so-called free buying is secondary to Government buying, and prices obey regulations rather than consumers' wants. Men in processing, transportation, and distribution who want to know what they should

aim to process, move, and market must consult official data, since war needs set the pattern for everything the country does. Military wants cut deeply into civilian supplies; but the outcome is not price boosting; it is rationing. The system of WPB directives and limitation orders, with its buttressing in OPA price ceilings and rationing systems, has roots in estimates and recommendations of the Combined Food Board and the Foods Requirements Committee. These bodies, however, speak not with their own authority but with the voice of the war.

AIDS TO PRODUCTION AND PROCESSING

But Government agencies must support their requests for production with aids to production. They must make price arrangements, not merely for agriculture, but for nonfarm contributors to food production. This is a task of delicacy and precision, guided by legislation only in broad outline. Our price-stabilization law sets criteria for price ceilings and price supports, but leaves details to administrative bodies, among them the spreads between farm prices, processors' margins, and wholesale and retail levels. Such phrases as the "roll-back" have passed into the common speech from public discussion of ways to hold the balance true. Faulty price adjustment, even if confined to details, could block production at many points. Good price administration is as truly productive as actual farming and manufacturing. Much more important than price now, however, is the provision of labor and machinery. This is imperative at all points in the production chain, from the farm, through the processing plant, to the final distribution for either military or civilian use.

Some food jobs affect points remote from battle fronts. For example, wartime curtailment of our imports from Central and South America harms the Latin American republics. Both for our sake and for theirs we must lessen the effects. One means is United States purchasing in Central and South America, sometimes with no immediate intention of importing the goods. In such operations, and also in purchases for quick importation, the Commodity Credit Corporation serves as the procurement agency. We are buying more coffee in Brazil and more cotton in Peru than we can import immediately, and leaving the purchased goods in stock piles. Such aid to our neighbors is not mere bookkeeping, but an actual transfer of purchasing power and it affects our goods supply. Other buying in foreign countries, for example, buying of the so-called preclusive type, has similar effects. Our purpose in preclusive buying is not to import the goods ourselves, at least not immediately, but simply to prevent the Axis from getting them. In such buying we are active in the neutral countries of Europe, in the Near and Middle East, and in Africa. It is important global strategy.

COORDINATED CONTROL NECESSARY

Though the food job starts on the farm, it by no means ends there. City facilities take, transform, and distribute the raw materials, in wartime ways very different from those of peacetime. Many Govern-

ment agencies, no single one of which could do it all alone, have a hand in the work. There are diplomatic aspects of it, as well as branchings throughout industry and agriculture. Diplomacy can change the food job as surely as can the gain or loss of battles. Purchases abroad of nonagricultural goods, such as tungsten, tin, manganese, and other minerals and metals, have farm effects here. Such purchases help us to match food production with munitions production. Our buying of wool, hides, and skins from Australia and South America, and our plans to aid production of rubber plants, drug plants, and fiber plants in the Americas influence the food job. As the mighty enterprise proceeds, the need increases to bind the threads for unified direction. There must be single, effective, coordinated control.

Food Dehydration

In wartime dehydrated foods have immense importance. Most of our foods are high in water content. Eggs and meat are three-fourths water, and some vegetables contain over 90 percent. Even quite dry-appearing foods contain 10 percent or more of moisture. Dehydrated foods occupy an average of only one-fourth the space occupied by the nondehydrated product and weigh only a fourth or a fifth as much. They save shipping space, transportation costs, and much tin, and reduce spoilage losses.

The water content of dried fruits usually ranges between 20 and 25 percent and that of dried vegetables between 10 and 15 percent. Properly dehydrated vegetables should contain between 4 and 7 percent moisture, depending upon the particular vegetable. Further researches may indicate that the moisture content should be lower than this for optimum keeping quality. In general, it takes about 10 pounds of fresh vegetables to make 1 pound of dehydrated, about 11 pounds of liquid skim milk to make 1 pound of dried skim milk, about 3 dozen fresh shell eggs to make 1 pound of dried, and about 4 pounds of raw, lean meat to make 1 pound of the dehydrated product.

In 1940 the Nation produced only a little more than 5 million pounds of dried vegetables. The production rose to approximately 15 million pounds in 1941 and will go much higher this year. The Department is working with the War Production Board and the Army Quartermaster Corps to expand our food-dehydration facilities.

Up to the middle of 1942 our lend-lease purchases of dehydrated foods consisted largely of vegetables and dairy and poultry products (mostly dried skim milk, whole milk, and dried eggs). In July the Department of Agriculture announced it would purchase quantities of dehydrated meat for lend-lease shipment. The Government has purchased more than 6 million pounds of dehydrated soups for lend-lease shipment and over half a million pounds of dehydrated tomato flakes.

During the first World War many commercial concerns went into the dehydration business poorly equipped and with little understanding of the problems involved. As a result of this and other handicaps dehydrated food was not a great success at that time. In 1921 the Department published the results of research it had done on the preservation of fruits and vegetables by commercial dehydration and subsequently outlined improvements in the technique.

Commercial dehydration of food requires specialized equipment and technological control. Successful operation of a dehydration plant is in some respects even more difficult than that of a cannery or of a quick-freezing establishment. Any concern which undertakes

food dehydration without skilled and experienced direction will undoubtedly suffer losses and will waste food that cannot be spared. The Department is helping canners and other qualified food processors to enter the dehydration field. As part of a technical assistance program, it is providing copies of dehydrator designs for plants of different capacities, and mimeographed material on the dehydration of specific vegetables.

OBJECTS OF DEHYDRATION

Dehydration methods must be used that will prevent the loss of minerals, vitamins, other nutritive values, color, and flavor. Dehydrated foods must withstand storage, sometimes under adverse conditions, without undue deterioration. They must ship well and must resemble the fresh food as nearly as possible when finally reconstituted. The raw material must be suitable. It must have been grown properly and harvested or slaughtered at the proper time; it must then be prepared promptly for dehydration and have suitable packaging and storing. In preparing fruits and vegetables for dehydration the main steps are washing, grading for size, peeling, trimming, pitting and seeding, blanching, and traying. Proper preparation is necessary to obtain a dehydrated product of high nutritive value, of good palatability, and of long storage life.

Production of citrus fruit juice concentrates is a growing industry. To prepare concentrate, fresh orange juice is flash pasteurized and then concentrated at a low temperature and high vacuum. The fresh juice contains from 10 to 15 percent of total solids; the concentrate has 65 to 70 percent, with only a slight reduction in the Vitamin C content. The concentrate has nothing added to it—neither sugar nor preservatives; and it offers a practical source of vitamin C, just as does the original juice. The juice of 12 cases of oranges can be reduced to 1 case of No. 5 cans of concentrate. Some 1,200,000 gallons of this concentrate have been shipped on lend-lease to be reconstituted with the addition of water to about 9,600,000 gallons of orange juice.

The edible portion of eggs consists of water to the extent of 75 percent. Purchases for lend-lease shipment totaled 157 million pounds of dried eggs from April 15, 1941, to May 1, 1942. Approximately 90 egg-drying plants are now operating in the United States with an annual capacity of 266 million pounds. The 18 plants in operation in 1940 had a normal capacity of only 10 million pounds. Production has been stepped up from 10 million pounds annually, the normal in earlier years, to 300 million pounds this year. Originally packed in 300-pound drums, the dried eggs are now being put into small moisture-and-vapor-proof packages (5 oz.) for distribution to the ultimate consumer.

Formerly whole-milk powder did not keep well. But basic research on milk fats, performed by the Department scientists, has shown how a whole-milk powder that keeps well may be produced. Some of it has been shipped abroad successfully in fiber containers, though tin is better. Substantial quantities of dried whole-milk

powder are now being purchased for lend-lease export. Hereafter, increasing amounts of dried whole milk will be shipped instead of dry skim milk.

Dehydrated butter can be made by melting pure unsalted whey butter and allowing the butterfat-water solution to stand until the water settles out. The butterfat is then put through cream separators, dried in vacuum pans, cooled, and sealed into the final containers. When properly made, it keeps well even at room temperature and can be shipped as general cargo. It can be used directly for cooking, or it can be reconstituted into butter by the addition of water, skim-milk powder, and salt.

PROGRESS IN MEAT DEHYDRATION

Dehydration of meat has not yet been perfected, but a product suitable for the preparation of such dishes as meat loaf, meat balls, and hash has been obtained. Dehydrated meat does not yet come in the form of miniature steaks or chops, though it may in the future. For drying the meat is cut in fairly small pieces or ground to hamburger consistency, and passed between steam-heated drums which revolve slowly. This treatment partially cooks the meat and removes from 45 to 50 percent of the water content. Final drying is accomplished in a cabinet drier at a dry-bulb temperature of about 160° F. The product occupies about half the volume of the original raw meat and weighs about one-fourth as much. It can be still further compressed in packing if necessary.

Program to Prevent Inflation

Last April the President announced a seven-point program to keep down the cost of living. This program called for:

(1) Heavier taxes to keep personal and corporate profits at a low, reasonable rate; (2) ceilings on prices and on rents for dwellings in areas affected by war industries; (3) stabilization of wages; (4) stabilization of farm prices; (5) more buying of war bonds; (6) rationing of essential scarce commodities; (7) discouragement of installment buying and encouragement of debt and mortgage retirement.

Such a program was necessary because consumer income had risen greatly though the supply of goods for civilian use was declining. This trend, if not checked, was bound to cause widespread shortages or higher prices or both these evils. It was bound, in other words, to cause inflation. Action was taken with regard to several of these points, but in September the President said two essential pieces of legislation were still lacking; namely an adequate tax program and a law permitting the fixing of price ceilings on farm products at parity prices.

The Congress had provided a new tax bill, but it fell short of the Treasury's recommendations; moreover the new taxes it imposes were not due until 1943. In the Little Steel Case the National War Labor Board had established a yardstick for wage stabilization; it had pointed out, however, that the formula should be applied to so-called voluntary wage increases as well as to disputed cases and that no mechanism then existed for that purpose. Sales of war bonds had fallen below the quotas, though savings in 1942 were at a rate about twice that of 1941; and the Treasury Department had recommended compulsory savings. Meantime the Federal Reserve Board had taken steps to curtail installment buying and hasten the liquidation of debts.

But the heart of the seven-point program was price control, which had been only partially effective because many commodities were exempt. Ceilings were in effect on specified goods and services under the General Maximum Price Regulation of April 28. This regulation established ceilings for the controllable commodities at the highest prices charged during March by each manufacturer, wholesaler, and retailer, and with pre-existing measures brought about 80 percent of the commodities in the wholesale price index under some form of price control. It influenced about 75 percent of the goods and services included by the Bureau of Labor Statistics in its cost of living index, and about 75 percent of the items in the index of the prices paid by farmers.

Only about 60 percent of the products that enter into the index of prices received by farmers came under the influence of the April 28 price regulation. The other 40 percent was exempt. This exemp-

tion was the result chiefly of the 110 percent of parity limitation in the Emergency Price Control Act of 1942. It resulted in a disparity between the behavior of the controlled and the behavior of the uncontrolled prices. For example, controlled prices of foods went down 1 percent from mid-May to mid-June and rose only 0.3 percent from mid-June to mid-July, whereas uncontrolled prices of foods rose 4.8 percent from mid-May to mid-June and 2.5 percent from mid-June to mid-July. As a whole the cost of living advanced only very slightly in the first and second months after promulgation of the General Maximum Price regulation, though from the outbreak of the war to near the end of April 1942 it had increased nearly 17 percent. But the uncontrolled prices were a danger.

As mentioned, uncontrolled food prices were exempt because of the 110 percent limitation under the Emergency Act. In full this limitation forbade OPA to set ceilings on processed or unprocessed agricultural commodities below a point which would return to farmers the highest of these four prices: 110 percent of parity; the market price on October 1, 1941; the market price on December 15, 1941; or the average price from July 1, 1919, to June 30, 1929. Many agricultural commodities were far below parity when this law was passed, and it seemed then that if farm prices were ever to average parity they should be free to rise slightly above parity at least part of the time.

THE PRICE SITUATION IN MIDSUMMER

But by the summer of 1942 the situation had become wholly different. Farm prices had gone above parity on an average, and consumer income seemed likely to support a continuation of the upward trend. Moreover, some groups regarded the 110 percent of parity provision as evidence that farmers wanted more than their fair share of the national income—that they were war profiteers. It served as an argument against economic controls in other fields. Accordingly, the Secretary of Agriculture recommended in a radio speech on August 19, that it be repealed, in line with the President's earlier recommendation that "the original and excellent objective of obtaining parity for the farmers of the United States should be restored."

In a message to the Congress on September 7, the President emphasized aspects of the seven-point program which had not been realized and asked for legislation to take care of them. He noted especially that the prices of uncontrolled foods had advanced considerably and were still going up. Under the 110 percent limitation, said the message, the lowest average level for all farm commodities at which ceilings could be imposed was not 110 but 116 percent of parity, and for some commodities it was as high as 150 percent. Along with a renewal of the recommendation to restore the parity objective, the President asked Congress to consider the advisability of passing legislation which would place a floor under farm prices, in order to "maintain stability in the farm market for a reasonable future time."

ANTI-INFLATION LAW

The outcome of the message, and of the congressional debates which followed it, was the enactment of an anti-inflation law (Public 729, approved October 2, 1942). This measure directs the President, through any Government agency, to stabilize prices, wages, and salaries, and prohibits ceilings on farm commodities or their products below parity or comparable prices or below the highest prices received between January 1, and September 15, 1942, with adjustments for grade, location, and seasonal differentials.

Though authorizing adjustments to correct gross inequities, it prohibits this power from being used to establish maximum prices below parity or comparable prices. Significantly, it requires modifications in price ceilings on farm commodities or their products when such modifications are necessary to increase production for war purposes or to reflect increases that may have taken place since January 1, 1941, in labor or other costs. It provides, too, that a fair and equitable profit margin shall be allowed in fixing the prices of farm commodities or their products and that adequate weighting shall be given to farm labor in computing agriculture's costs.

Other provisions important to agriculture raise the loan rate for basic agricultural commodities to 90 percent of parity, but authorize the President to continue the present 85 percent rate if he determines that such action is necessary to prevent an increase in the cost of feed for livestock and poultry or to aid in the effective prosecution of the war. Loan rates have been raised accordingly on cotton, tobacco, rice, and on marketing-quota peanuts, but not on corn and wheat. The rates provided under the new legislation are to be maintained until the expiration of a 2-year period after the end of the war.

Under an Executive order that became effective October 5, price control extends now to about 90 percent of our food. For various reasons it still does not cover several important seasonal products, such as most fresh fruits and vegetables, nor does it extend to peanuts and fresh fish. New products covered include butter, cheese, evaporated and condensed milk, poultry and eggs, mutton, flour and corn meal, dry edible beans, dry onions, and fresh and canned citrus fruits and juices.

Temporary regulations froze the prices of these products for 60 days. The purpose of the temporary freeze was to give price officials a chance to talk with farmers, processors, wholesalers, and retailers before the Government set permanent ceiling prices. Exempted were farmers' sales to first handlers; the regulation affected prices to farmers through the limits it placed on what processors and dealers could charge. However, it covered prices which the farmer could charge in sales directly to consumers if his direct sales the previous month had exceeded $75 worth of products.

FACTORY AND FARM ADJUSTMENT RECIPROCAL

As first introduced, the anti-inflation bill provided that farm labor should be taken into the reckoning of parity prices and comparable

prices for agricultural commodities. This provision does not appear in the final enactment, which makes no change in the parity formula. With regard to wages and salaries, which are to be stabilized so far as practicable on the basis of September 15, 1942, levels, the law forbids action which would be inconsistent with the provisions of the Fair Labor Standards Act of 1938 as amended, or with the National Labor Relations Act.

Factory and farm adjustments, through simultaneous wage and price controls, will tend to be reciprocal under the law. Success in either field will smooth the path in the other. On the one hand the wage and salary limitations will tend to keep the prices that farmers pay from rising; on the other hand the control of farm commodity prices will lessen the pressure for wage boosts to offset higher living costs. In both town and country the law should help to keep purchasing power in a better relationship with the supply of goods, and consequently to check inflation.

The law recognizes the part that prices play in getting war production. This recognition takes form in the provisions which authorize the raising of ceiling prices if such action is necessary to offset rising costs of labor or other means of production, or if higher prices are necessary to increase production for war purposes. As we approach full employment of our agricultural resources, it will be difficult to get further general increases in production through price advances. The limiting influence then will not be prices but production power. Nevertheless flexible prices may still be very useful in getting increased production in particular lines, and such flexibility the law permits.

PROPOSED ADDITIONAL RATIONING

Many people cannot understand the sixth point of the program; namely, the proposed additional rationing of commodities, which eventually may affect many commodities. Output and marketings of meat animals, for example, will set new high records this year, and probably still higher ones in 1943. Yet in meats we are to have rationing. Persons who doubt the necessity do not realize the jump that has occurred in the civilian, military, and lend-lease demand for meats and other livestock products.

For various reasons, some of them obvious and others in the nature of military secrets, the war cuts deeper into our expanded meat supply than anyone could have expected. Requirements for our own armed forces are enormous. We have stepped up our shipments to Great Britain. To satisfy the military and lend-lease wants and at the same time to provide civilians here with all the meat they would like to buy is impossible; so we give preference to the war demand and limit our own consumption. This policy reflects the most thorough study of everything involved, in the light of our own best national interests.

In addition, however, rationing is essential to price control. Shortages develop in total war even in commodities produced abundantly, especially the basic foods. Keeping a sufficiency within the reach

of the civilian requires rationing as well as price control. Fixed prices can hold for scarce goods only with greedy buying outlawed and supplies allocated fairly. How long, for example, would the price level hold for fuel oil if moneyed folk could fill their tanks and all their improvised containers? Oil would run into hiding fast, and the driblet that remained would bring bootleg prices. Rationing destroys the motive to bid up prices, because under rationing no one can hog supplies. Each buyer knows in advance how much he can obtain and has no incentive to offer a fancy price.

What the degree of rationing should be turns largely on the shipping situation. Our military outposts include the British Isles, Iceland, and points in Russia, Africa, and Inda; also Australia and New Zealand and other lands in the Pacific. Allied shipping has to carry both foods and munitions to these outposts in a balance determined by military requirements. The need to save time and distance puts a premium on the use of the North American food supplies and postpones the equal use of more distant supplies. This increased dependence of the United Nations on the United States, which thus becomes more and more the food arsenal of democracy, has rationing here as one of its inevitable results. Mild as compared with that of the other countries in the war, our rationing is part of the price of victory.

Getting full effectiveness from our human and military resources will necessitate rationing. Civilians should understand the reasons. The rule that military needs rank first means that rationing is not the means of conserving supplies for our fighters and our allies, but simply of dividing civilian supplies fairly. Other measures take care of the military supply problem, such as limitation orders and Army and Navy and lend-lease requisitions. These come first; the rationing procedure applies only to what remains after the requirements of the battle fronts have been met and reserves accumulated to provision recaptured areas and help write the peace. In war for survival this is obvious common sense. Letting the United Nations' fighters down would let us all down—in a hurry.

Naturally, however, the partition of supply between the war front and the home fronts puts the home front in a difficulty. In the first place it shaves the civilian supply down to strict necessity, and secondly, it leaves civilians with more food money than they can spend. Most people understand how the second phase of the problem develops. War employment, in both town and country, expands civilian earnings without proportionately increasing the supply of purchasable goods. In the early months of the war civilians who found automobiles, refrigerators, radios, washing machines, and other industrial goods less and less obtainable had still the chance to buy more farm goods. But that is true no longer. The war is claiming more and more of our farm production, as well as of our factory output. What remains for civilians must be allocated fairly.

This is the purpose of rationing. Equitable rationing, in a framework of effective price controls, ensures fairness in the distribution of civilian goods; it prevents the richer folk from using their money to get more than their share; it prevents those with leisure time from

buying needed supplies away from the families of war workers who are putting in long hours and having only moments for shopping. Civilians need not go hungry to make our food supply effective in the war. They can eat well and at the same time strengthen the battle lines, through the effect their eating has on their production. But this is only possible with rationing. Without rationing, the civilian supply would be badly distributed; it would lose part of its war effectiveness, through waste in some groups and privation in others. Eventually, indeed, the lack of rationing would lessen the quantity available for military uses, since the unfair distribution would create relief needs, which would have to be met. Rationing is a way to cut down the wartime hardships of civilians.

Farm Prices and Incomes

Our drive toward a full war economy means dropping activities that don't build fighting power and makes supplies more important than prices. In the early stages the compulsion to change our patterns of production and consumption is light, but it increases with the Nation's danger. Through 1941 we could produce more goods than previously for civilian consumption as well as more war goods. Our defense program, because it drew on land, machinery, and manpower which had been idle, required no sacrifice whatever from consumers. But after Pearl Harbor we could not meet the demand for war supplies in just that way; it had become too great; we had to dip into productive capacity previously in other employment. This applied to agriculture as well as industry.

Great diversion of effort and resources from nonwar to war goals is necessary now. Our human and material resources, though greater than those of any other country, do not suffice for total war plus business as usual. Sacrifice for all is in order, with no chance for any large group to escape. Farmers, along with nonfarmers, are having to place a greater proportion of their incomes at the disposal of the Government, either through taxes and savings or by renouncing chances to make money—methods that come to the same thing in the end. Essentially, they are in the Army now, along with other groups.

In wartime the Government itself is a heavy consumer. So that it may supply our fighters, it competes with city people for farm products, and with farmers for supplies necessary in farming. It must therefore regulate both production and consumption and also price relationships, with war objectives ranking first. Getting more of one thing often means reducing the production of another. This involves a governmental drafting of production powers, which parallels our military drafting and requires each person in each walk of life to make the contribution he can make best to the Nation's cause, in either fighting, work, or financial sacrifice. Necessarily the control extends to agriculture.

Getting war production in agriculture takes price incentives. plus an allocation of resources, men, and equipment such as fertilizer, tractors, steel, bale ties, nails, gasoline, tires. Moreover, we do not get this sharing of production facilities automatically through the play of prices, wages, and income prospects. It comes from action by Government agencies, which must direct the farm war effort along with aircraft, gun, and tank production. Supply and demand prices do not work well in wartime. In some commodities large increases cannot be obtained at any price since the production capacity is insufficient. Nevertheless prices continue to be a major production-shaping force.

In August 1939 the farm price index (1910–14 base) stood at 88. In November 1941 it stood at 135, raised to that level partly by governmental programs. In the same period the parity index, or the farm-price level necessary to give farmers parity, advanced from 121 to 143. This period saw an increase in the prices of farm products generally and a smaller increase in the prices that farmers pay. The result of course was a material improvement in the net position of the farmers. But such improvement is not the main farm goal any longer. Victory takes first place now; equitable farm prices are means to that end.

PRICE AIMS AFTER PEARL HARBOR

In December 1941, when we too entered the war, fighting power rather than farm advantage became the top-rank purpose. Properly adjusted production took precedence at once. For war reasons farmers had to grow crops which for price reasons they might not have grown, such as peanuts and soybeans in certain areas. They increased their output generally though in some lines not in the best balance. It was necessary to achieve a more selective cropping, through wholesale redirection of the agricultural effort. The utility rather than the profitableness of crops determined what should be grown. Price support came to have a national rather than primarily an agricultural justification.

For their greater and more diversified production farmers received higher prices and earned higher net incomes. Between November 1941 and September 1942 the index of prices received by farmers advanced from 135 to 163. The index of prices paid by farmers advanced also though less rapidly. In other words, farm prices continued to gain on nonfarm prices. In the first 9 months of 1942 the ratio of prices received to prices paid by farmers, plus interest and taxes, averaged slightly over 100—i. e., close to the parity goal (as an average for all farm products). Because farm marketings were of record size, farmers had above-parity income as well as price parity.

Farm income in 1942 will be well above the parity income level. It will substantially exceed the income from agriculture in 1941, which, with Government payments included, was about $8,964,000,000, as compared with only $6,313,000,000 in 1939. The income per person on farms, with Government payments included, increased from $171 in 1939 to $254 in 1941, or from 94 to 112 percent of parity on a per capita basis. For 1942 the comparable figures are likely to be about $368 and 136 percent of parity income. Losses which farmers suffered in the depression years have not as yet, however, been entirely wiped out.

Estimates for 1942 indicate that cash farm income, with Government payments included, will exceed 15 billion dollars; this is considerably more than the previous high level reached in 1919. The net income of farm operators, or the amount available to persons on farms for use in family living and for savings, is estimated at nearly 10 billion dollars—about a billion dollars greater than the amount available in 1919.

COMPARISON WITH NONFARM GROUPS

Broadly the position of most farmers has improved more than that of some and less than that of other urban groups. Many people on fixed salaries and wages have lost heavily. Taxes and the costs of nearly everything they buy for living have advanced, while their money earnings have remained the same. Some businesses are making tremendous profits; others are suffering because they cannot get raw materials, because their wage costs have risen, or because their market outlets have been curtailed. Many wage workers have profited by the great increase in industrial activities. Many unemployed have gone back to work, and many wage earners are working full time or overtime. Wage rates have advanced and the hours employed have increased. Hence pay rolls have swollen greatly.

Among farmers, rewards and sacrifices cannot be equalized. It is not feasible to establish a simple price ceiling for all farm products at parity. Allowance must be made for seasonal variations in prices and also for great variations in the annual supply and demand conditions. Prices for all livestock products could not conveniently be set at parity. The demand for them has increased too greatly, and the war conditions increase the requirements. Some farm products, on the other hand, do not fit the current need. Others are in such urgent need that above-parity returns may be necessary to evoke a sufficient supply. Such inequalities, which have their counterpart in industry, are inseparable from the war effort. With victory the supreme objective, we cannot reorganize our economy immediately so as to provide even-handed justice too.

Most farmers are still ahead in this relationship between the prices of what they sell and the prices of what they buy. But some farmers are behind in it. They have not received prices sufficient to cover the advances in the costs of their production, and their costs of living have increased. The need for keeping farm costs for labor and other means of production in balance with farm prices is prominent in the over-all price-control and production program.

PARITY OBJECTIVE STANDS

Farm programs and the farm income situation must meet the test of war. Fortunately the agricultural war effort does not conflict with progress toward parity of farm and nonfarm incomes. On the contrary, the latter is a means of strengthening our fighting power. Farmers have not had parity prices and parity incomes long enough to be fully compensated for their former handicaps, and eliminating more of the hang-over helps them in their war job. But farmers must renounce the greater incomes which would be open to them were prices uncontrolled. They will have the right, when the war is over, to remind the country that they did not take undue advantage of the wartime market; they will have a just claim then to protection against possible post-war deflation.

Farm Price Supports

Farm price support programs before the war consisted largely of commodity loan or diversion operations administered by the Commodity Credit Corporation or the Surplus Marketing Administration. They looked toward production adjustment, the attainment of parity prices, or the attainment of parity incomes for farmers. Such goals represented what both farmers and nonfarmers regarded as fair, and stood the test of discussion, legislation, court procedure and action. The war adds a new goal for the price-support programs—the increased or maintained production of strategic agricultural commodities. This new goal is now the most important one.

Many of the price-support programs are tied to the parity formula by legislative action. The Agricultural Adjustment Act of 1933 declared it to be the policy of Congress "to establish prices to farmers at a level that will give agricultural commodities a purchasing power, with respect to articles which farmers buy, equivalent to the purchasing power of agricultural commodities in the base period." For most commodities the base period taken was the pre-war period, August 1909–July 1914. For some commodities, such as tobacco, post-war base periods were selected.

At present, the current parity prices of most commodities are calculated by multiplying the average price in the pre-war base period by the current index of prices paid by farmers for commodities, interest, and taxes. The commodities for which post-war base periods are used have a parity calculated in a slightly different way. Their base period average is multiplied by the index of prices paid by farmers for commodities alone, with interest and taxes excluded. Section 4 of Public Law 147, 77th Congress, authorizes the computation of comparable prices for those commodities for which economic conditions have changed substantially since 1910–14.

Present legislation authorizes three principal means of supporting farm prices. First is the adjustment and conservation program, which includes commodity loans, acreage adjustments, marketing quotas, storage in the Ever-Normal Granary, and conservation and parity payments. Price support of this type applies to the basic crops; namely, corn, wheat, cotton, rice, tobacco, and quota peanuts. Growers can store their surpluses under Government loans, which are of the nonrecourse type. If farmers do not wish to repay them, they can let the Government take the pledged crops as security. Potentially, therefore, the loan program is a purchase program. Acreage adjustments and marketing quotas reduce the loan funds required and protect the National Treasury.

The second main feature of the farm-price legislation is the marketing-agreement system. Several laws authorize the Secretary of Agriculture to enter into marketing agreements with producers, processors,

and distributors. These agreements, in effect, regulate the market in such a way that producers' prices are maintained at reasonable levels. This branch of the legislation, with the addition of surplus diversion and disposal features, was the principal means available up to 1940 for supporting the prices of nonbasic commodities. In addition, the Commodity Credit Corporation could make loans on nonbasic crops.

Marketing agreements have helped especially to improve the returns from dairy products and fruits and vegetables. Frequently, they include provisions for affecting prices by the regulation of marketing or by the diversion of supplies to special channels, such as relief consumption and industrial utilization. Marketing agreements and orders are in effect for a wide range of commodities, especially milk, various fruits and vegetables, and various specialty crops such as hops and walnuts. The war enormously increases the demand for certain nonbasic crops and temporarily lessens the need for some aspects of the marketing-agreement program.

A third or combination method of supporting prices is now available—Government purchases or loans at announced price-support levels both for our own requirements and for lend-lease exports. Thus, in 1941 the Department found it necessary to encourage expansion in hogs, eggs, evaporated milk, dry skim milk, cheese, and chickens, and on April 3, and September 8, 1941, it announced price supports for certain of these commodities. Subsequently (on January 16, 1942) it added soybeans for oil and peanuts for oil to the list and extended the period to be governed by the price support for all of these crops up to June 1943. More recently other commodities have been added. Some of these supports reflect the Steagall amendment, Public Law 147, 77th Congress, which directs the Secretary of Agriculture to support the prices of nonbasic agricultural commodities, expanded production of which he proclaims to be necessary.

The need for wartime production has made it necessary to extend the price support for some products to various points intermediate between the farm producer and the ultimate consumer. For example, the Government guarantees certain prices to oil crushers for both oil and certain byproducts of oilseeds. Also the Department does some buying at farmers' local markets. In buying eggs in the Southern States, for example, it arranges with refrigerator and warehouse operators to accept them from farmers or farmers' representatives in lots as small as 10 cases, so that local purchasing will help to maintain normal spreads between local and central market prices. The Department takes steps, in some instances, to see that the processors from whom it buys have paid the support prices to farmers. Necessarily the Department has to do the bulk of its buying through many channels—on the commodity exchanges, at central markets, by the offer and acceptance plan, and at places distant from many farmers. Its buying at these markets, however, tends to support prices to producers in all parts of the country.

Price-support levels should not be interpreted as applied to every day or to every farmer. Usually the application is to national season-average prices. Prices may vary at times, or at different places, from the proclaimed average price-support level. The Government does not commit itself to the maintenance of a single national price

everywhere, without regard to normal grade, location, or seasonal differentials. Nevertheless, in the weeks or months during which requested production is due to be marketed, the Department will endeavor to support the price thereof at a level reasonably close to the seasonally adjusted support level, with proper adjustments for grade, quality, and location.

In general, it will continue the price-support program connected with the Food for Freedom movement long enough to allow for the marketing of the production evoked. It hopes also to be in a position to protect the producer against any sudden change subsequently in the market's requirements. The existing commitment, as already mentioned, covers the period through June 30, 1943. There is another important feature. When the need comes to terminate the nonbasic-crop price supports, they will end with the normal or natural marketing season for each commodity. Farmers will thus have time to plan their operations suitably for the coming season.

The Congress took the first steps in this direction in the amendments to our existing agricultural legislation which were included in the Anti-Inflation Act as approved October 2. These amendments provide for the extension of commodity loans on the basic commodities at 85 or 90 percent of parity, and price supports of nonbasic commodities for which significant increases in production are needed for war purposes until 2 years after the President or the Congress proclaims the war to be ended. This general extension of authority will, of course, have to be supplemented from time to time by such appropriations or authority to enter into commitments as may be needed.

The maintenance of agricultural production—of food and fiber supplies for ourselves and our allies—is becoming increasingly important and increasingly difficult. Price supports will be needed, and will be an integral part of the production program for 1943. Supports will be continued for all, or almost all, of the products currently supported, and others will be added. And, in almost every case, the support level will be as high or higher than in 1942. But it must also be remembered that prices and price supports are not alone sufficient for the job ahead. If agricultural production is to be maintained, there are also many other factors—machinery, fertilizer, other materials, and above all, farm labor—which must be considered and successfully handled.

Farm Needs for Machinery and Other Supplies

The Office for Agricultural War Relations is the staff agency of the Foods Requirements Committee and the liaison unit between the Department of Agriculture and the other war agencies of the Government. As such, it channels estimates and programs to the committee for use in connection with the war requirements for food and nonfood materials derived from agriculture. It is part of OAWR's job to help relate farm production to military, lend-lease, and civilian needs, to provide basic criteria for formulating production goals, and in the light of other war requirements to analyze agriculture's needs for machinery, fertilizer, and labor. Other OAWR duties are to compile and summarize data on early stages of marketing and food processing, to work with other agencies on programs for economizing storage and transportation facilities, and to assemble information on food imports and exports. It is not, however, an operating agency; it does not carry out any of the programs which it helps to develop. For example, the actual rationing of farm machinery is a responsibility of the Agricultural Conservation and Adjustment Administration.

Farmers in this country entered the world conflict reasonably well provided with farm machinery. In 1941 the production of farm machinery for sale in the United States was nearly one-fourth greater than in the previous year, which in turn had been an active year for farm-machinery sales. In fact, sales of farm machinery during 1940 were equal to what they were in the predepression year 1929. Farmers purchased farm machinery liberally in the 5 years that preceded 1940; their average annual purchases in this period were only 6 percent below the 1940 level. Moreover, the supply of machinery on farms when the Japanese made their attack on Pearl Harbor was in good condition and for the most part of relatively recent models. It was inevitable, however, that a shortage would develop from the diversion of metals from farm-machinery making to munitions production. The shortage has reached the point now where it necessitates a full-scale rationing program for the 1943 crop year.

On the basis of information assembled by OAWR this Department and WPB conducted a farm-machinery program for the year which ended October 31, 1942. This program established a quota roughly equal to about 80 percent of the new farm machinery manufactured in the previous year and a quota of about 150 percent for repair parts. It allowed wide variations in individual items, in line with the materials situation, the farm production program, substitution possibilities, and labor-saving opportunities. For example, it allowed for only 73 percent of the 1940 production of horse-drawn

disk plows but authorized production of cream separators at 206 percent of the 1940 level. It eliminated the manufacture of steel wheelbarrows entirely but authorized the production of wooden wheelbarrows at 100 percent of the previous year's output. This program took care of farm needs fairly well though farmers would have purchased many items of equipment in larger quantities had the supply permitted. Nevertheless, shortages developed in some types of machinery and in some areas.

As the year drew to a close, however, the steel situation became extremely tight. So heavy were the demands for steel that the War Production Board was unable to make allocations beyond the last quarter of 1942, and it had to keep those at the barest minimum. Shortages developed in other metals and materials that enter into farm machinery. Meanwhile, stocks in dealers' hands were scarce. Surveys indicated that dealers would carry over practically no farm machinery from 1942, and the supply on farms was in extra heavy use and suffered more than the usual wear and tear.

It was evident that 1943 would present a very serious farm machinery problem, which would necessitate rationing the supply of machines to farmers as well as continued strict allocation of metals and other raw materials to manufacturers. Accordingly, the Secretary of Agriculture on September 17 announced a temporary order which prohibited the sale of new farm machinery and equipment except as specified in a rationing system. The announcement was in line with an OPA order of September 16, which delegated the necessary rationing authority to the Department.

EARLY RATIONING PROCEDURE

Action taken in 1942 with regard to farm buildings and crawler-type tractors established a precedent and a pattern for this rationing. The first step was an order issued in the spring, which generally restricted the construction of buildings except by permission of WPB. Through OAWR, the Department and WPB arrived at an agreement for handling applications for permission to construct farm buildings. Farmers presented their applications to their County USDA War Boards, from which point they came through to the State Boards, to this Department, and then to WPB.

Similar arrangements subsequently governed the release to farmers of crawler-type tractors, practically all stocks of which had been preempted for military use, along with all facilities for producing them. On the recommendation of this Department, priorities officials made a small supply of this type of tractor available for agricultural use. The rationing for 1943 will be handled through farmer applications successively passed on by county and State USDA War Boards and by the Department of Agriculture.

Ground work was laid also in 1942 for other ways of dealing with shortages of critical materials. Among them are the simplification of designs, the substitution wherever possible of less critical materials, the repair of old machinery, the more complete use of the machinery already on farms, and the collection of scrap material. All these

measures and others besides will have to be developed extensively in 1943. They can be very effective. For example, the fence program reduced the types and sizes of wire-net fencing so that manufacturers were able to produce 50 percent more roddage from the same quantity of metal.

The machinery program in 1943 will continue to emphasize the importance of repair. As already noted, the 1942 plan limited new machinery to about 80 percent of 1940 production but allowed for repairs equal to 150 percent of those in 1940. New production of farm machinery during 1943 will be at 20 percent of the average production of 1940 and 1941, with manufacture of repair parts at 130 percent of the average production of those two years.

CHEMICAL SUPPLIES ALLOCATED

It has been necessary for WPB to allocate practically all the chemicals which are of importance to agriculture. It has recognized, however, that foods, feeds, and fibers are war materials and has considered agriculture's needs in establishing the chemical priorities.

Chemical nitrogen, which is indispensable as a fertilizer material, is also the base of our explosives program. Agriculture must therefore relinquish its normal priority in the use of this material. Knowing the importance of agriculture's requirements, the War Department has undertaken a construction program to provide sufficient nitrogen for military, industrial, and agricultural purposes. But the completion of this program will take time. Meanwhile the war agencies have arranged for the importation of sufficient Chilean nitrate to take care of minimum farm requirements.

The situation with respect to most chemical insecticides, fungicides, and disinfectants is relatively satisfactory. For example, the war agencies, though they need copper for ammunition, shells, and war instruments, have recognized that the farmer needs copper sulfate and have seen to it that agriculture may secure supplies of copper insecticides and fungicides. Arsenic helps to make war gases; but lead arsenate and calcium arsenate, and other arsenicals, must be used to protect certain crops, particularly cotton and fruits. Accordingly, war agencies and industry have cooperated with this Department so that arsenicals may be produced and delivered for the protection of foods. This has required the curtailment of supplies of industrial and agricultural nonfood uses.

Chlorates contribute to the production of military flares and explosives; but chlorates find their principal use in agriculture for weed eradication. So that supplies may be sufficient for all requirements the production of chlorates has been increased. War gases, synthetic glycerol, and numerous other war products make heavy demands on chlorine. But agriculture needs chlorine derivatives for grain fumigants, dairy disinfectants, and animal medicinals. Therefore the fighting units have taken care to see that agriculture has its necessary supply.

This favorable treatment for agricultural reflects WPB's recognition that priorities for the production of food should be higher than

priorities for ordinary civilian activities. Its first application was in a general order that pertained to insecticides, fungicides, and disinfectants. Numerous subsequent special priority orders have recognized it. Our obligation to feed the United Nations, as well as to provide our own fighting forces with abundant food supplies, indicates that agriculture's needs will continue to have recognition in priority rulings.

Fuel for Farm Traction

Large supplies of motor fuel are essential to our food-production effort. In 1941 farm tractors, motortrucks, and automobiles used more than 3½ billion gallons of gasoline and other fuels. One of the really big jobs in the months ahead will be to use all motor fuel most effectively—to save wherever possible so that the needs of our armed forces and of industry for fuel and rubber will be supplied.

We can reduce the personal use of automobiles on farms as well as elsewhere, but the actual operation of modern farms uses automobiles considerably. Savings in the use of fuel for farm automobiles and for farm motortrucks can be effected to some extent by closer cooperation among farmers in the hauling of supplies to the farm and of products to market. But we cannot expect to reduce the usage of farm hauling equipment below reasonable levels if our farm products are to be harvested and marketed without waste. Likewise we must keep our tractors in the fields in full force if production goals are to be realized.

Our dependence on modern motorized equipment is strikingly shown by comparing conditions now with those during World War I. In the first World War, farmers depended almost exclusively upon manpower and animal power. Production now is dependent very largely upon manpower and motor power. Twenty-five years ago there were 25 million horses and mules on farms; now there are less than 15 million. In World War I there were very few tractors and trucks on farms. Now there are 1.8 million tractors, more than 1 million motortrucks, and more than 4 million automobiles. Farm consumption of motor fuel for all purposes totaled little more than a half million gallons per year during World War I. The total in 1941 was more than 3.5 billion gallons.

Farm tractors will probably use more than half the total motor fuel consumed on farms during the next few years. Tractor sales in 1941 were the largest on record; but the number of farm automobiles in use probably will average lower in 1942 than in 1941. Some decrease in the mileage of motortrucks may be expected, also, through efforts to conserve rubber and gasoline. If it were not for restrictions, the use of motor fuels on farms in 1942 would undoubtedly be larger than in any other previous year.

The number of work animals in the United States is the smallest in many years and the number of workable age will continue to decline because of a shortage of replacements. Work aimals are fewest in the commercial farming areas, where the heavy tonnage of food is produced. The manufacture of farm machines of all types is being restricted because of the need for the materials in war. Machines powered by motor fuel must be kept running if those

workers who are left behind are to produce the extra food and fiber required by fighting men around the world. Farm machines properly powered will ease the load of the older men and women and of the less efficient workers.

The Department has taken steps through the local War Boards and its extension machinery to bring about organized efforts to conserve tires and motor equipment. In this effort it has been fully supported by State agencies and by individual farmers and organizations all over the country, who have undertaken in innumerable ways to eliminate unnecessary mileage per vehicle. Organized steps have been taken in thousands of country neighborhoods to "double up" on loads from farm to town and likewise in bringing supplies from town to farm and for errands and trips of all kinds. Farm neighbors have begun to cooperate effectively to see that the use of the neighborhood vehicles is rotated and every possible mile of service got out of these tires and trucks.

RAIL EQUIPMENT FOR MOVING FARM PRODUCTS

Among the several types of railroad equipment, agriculture usually finds the boxcar most important. Boxcar equipment will probably be adequate for essential needs. The refrigerator car, also very important, is rather limited in supply. This type of car, moreover, must be used increasingly to replace truck movements of fruits and vegetables. Such wasteful practices as the use of refrigerator cars for cold storage and ripening warehouses have been ordered discontinued by the Office of Defense Transportation. Confined to its proper use, the refrigerator car supply may suffice to take care of the decline in truck movements of fruits and vegetables.

Another type of equipment important to agriculture is the livestock car. More and more livestock has moved by motortruck in recent years, and the supply of railway livestock cars has been allowed to decrease. If livestock trucks become unable to carry the traffic and turn it over to the railroads, a shortage in livestock cars will develop unless an over-all controlled marketing plan is followed. Carriers and shippers foresee the problem. They are planning more carefully for the livestock movement.

Faced on all sides with increased burdens, the railroads will unquestionably have difficulties. But if all users of railroad transportation cooperate in the use of it, the difficulties should be temporary. The slack in the operation of the railway system has not yet been taken up. Sudden or arbitrary transportation demands could disrupt the balance, but the carloading curve is flattening out. On the basis of what is happening now, we can expect an efficient handling of rail problems, rather than a serious worsening of them.

Pressure on Storage

Production of war goods, both agricultural and industrial, especially in recent months has put tremendous pressure on our warehouse and storage facilities. Warehouse space at seaports and at interior storage depots is in use to its capacity. Requirements are heavy for storage space in producing areas for numerous farm products, especially grains, oilseeds, processed dairy products, canned goods, and tobacco. The shortage of shipping, the necessity for extending our supply lines to many distant points, the hearty response of American farmers to the Food for Freedom program, and favorable weather for crops, have intensified the problem.

Grains especially are in a critical position as regards storage. Stocks of the nine principal small grains (exclusive of corn), and of beans that need tight-bin storage were more than 200 million bushels larger at the beginning of this crop year than a year ago. Production of these grains in 1942, as indicated by the August 1 crop report, may add at least 300 million bushels more to the supply than in 1942. The bulk of the corn crop is stored on farms, and our increasing livestock numbers require larger quantities for feed. So the pressure of corn on storage space, particularly commercial storage space, will not be so great as in recent years.

Other uses of grain, such as its conversion into industrial alcohol, give hope of reducing supplies that will need storage. Also the quantity of stored grain that can be released for livestock feeding will influence the storage situation. About 6 million bushels of wheat went into alcohol making during the first 6 months of 1942 and 35.4 million bushels more into feeding. But such outlets are relatively small. Unless they become much larger, the carry-over of wheat at the beginning of the 1943 crop year may exceed 800 million bushels.

Wheat storage is the biggest problem. Ordinarily a large percentage of this crop moves through commercial channels, and virtually all the usable commercial wheat storage space has been full since the beginning of the 1942 harvest. This has impeded the flow of wheat, and obliged the farmers themselves, aided by the Department agencies, to furnish new storage space.

The Department worked with farmers and the grain trade to build as much new storage space as the shortage of critical materials allowed and to make as much room as possible for the new crops. The Office for Agricultural War Relations presented the problem to the War Production Board which granted priorities for materials to build terminal and subterminal extensions for some 15 million bushels. In addition the War Production Board approved another 10 million bushels new capacity for country elevator annexes and similar commercial

storage. It freed sufficient lumber and nails in surplus grain producing areas to enable farmers to expand their storage facilities and authorized the building of prefabricated temporary bins for sale to farmers and for use by the Commodity Credit Corporation.

Nevertheless, even these activities, along with the fullest cooperation of terminal storage operators, did not wholly serve. Some grain had to lie out in the open temporarily or be stored in idle brooder houses, vacant storerooms, and other makeshift places.

ACTION TO ECONOMIZE STORAGE SPACE

This Department took a number of steps to meet the need:

1. It made a survey of grain storage space which indicated that, exclusive of the year's new construction, the total commercial storage capacity slightly exceeded 1,600 million bushels. Only a little more than 1,300 million bushels of this capacity was usable at any one time, however, because of the need for working space. It is not practicable to make a complete census of farm storage space. Farm storage records indicate that approximately 2,000 million bushels capacity was available on the farms this year, exclusive of the additions.

2. As a means of keeping commercial storage fully busy, the Department participated in the work of marketing committees in 22 of the principal grain markets. These committees, which represent the principal grain market factors and organizations, have made continuous check-ups of storage capacity and facilitated its maximum utilization. They have also promoted an efficient use of transportation facilities in and out of grain markets and milling centers.

3. Building materials obtained through priorities permitted construction of approximately 25 to 30 million bushels of new commercial storage space in 1942, much of it in the form of additions to existing houses. Such additions required a minimum of machinery and other critical items. In the campaign for more farm storage the Department brought the need to the attention of the farmers. It asked and obtained release of lumber and nails in surplus wheat-growing areas, and urged the farmers there to build an additional 100 million bushels of storage space themselves. Through the Commodity Credit Corporation it transferred many steel bins, formerly used for corn, to the chief wheat producing States. These bins represented about 33 million bushels of storage capacity. Also the Department made sufficient space available in the Corn Belt to hold 50 million bushels of wheat for livestock feeding. Contracts awarded by the CCC for prefabricated wood bins promised about 100 million bushels capacity more. Bins of this type require a minimum of critical materials—only nails and a small amount of hardware. Farmers may buy them or they can be used to house Government-owned grains.

4. In the far western grain States and the southern rice States, producers changed to some extent from sack storage to bulk storage, and will have to rely still more on bulk storage next season. The burlap shortage will then be extremely critical. Second-hand sacks

and sacks in inventory, plus space that had been converted, kept storage in these areas operating this year with reasonable efficiency.

5. Lessening of storage congestion resulted from the better use of railroad equipment. The car service division of the Association of American Railroads maintained a rigid control and instituted a permit system before the 1942 crop began to move, so that no car of grain could be loaded unless the grain had an assured home at the other end. This system prevented congestion at ports and terminals and insured prompt unloading and release of equipment. Committees in the principal markets allocated the transportation impartially. They prohibited grain storage in railroad cars.

PEANUTS AND SOYBEANS PRESENT STORAGE PROBLEM

Producers of peanuts and soybeans met the challenge of the oil crop need with a volume of production that created new storage problems. Acreage of peanuts for picking and threshing increased from slightly less than 2 million acres in 1941 to over 4 million acres of peanuts in 1942. Acreage of soybeans for beans increased from less than 6 million acres in 1941 to over 10 million acres in 1942. These are record acreages. Farmers do not ordinarily store the great bulk of the peanuts on the farm, and more storage space was necessary. Some warehouse space used formerly for cotton, tobacco, and fertilizer supplied part of the need, and the Department asked priorities officials to approve new construction with about 200,000 tons capacity. Enough processing capacity was available at cottonseed crushers, but storage for the huge peanut crop had to be provided until the crushers could handle it.

Soybeans present both a storage and a processing problem. Frequently, they have a high moisture content which makes them difficult to store, especially on the farm. Processing capacity has been in excess of the production in previous years and there has been little if any carry-over. But this year, with the crop 70 to 80 percent larger than the previous record crop, a small carry-over may be built up and some soybeans may be moved out of their normal processing area. If rail facilities permit, some soybeans may be shipped to the Pacific coast, to utilize copra and linseed equipment and replace oil cake normally imported by feeders there. Some may be shifted to southern cottonseed presses. The South has an excess of cottonseed crushing capacity which can be used to crush soybeans, although it is not as efficient as the expeller and solvent extraction processes generally used to process soybeans. Linseed crushing plants in the Northwest and on the Atlantic coast will receive some soybeans to process.

Soybean processors in the Middle West, with capacity operations, can process between 100 and 110 million bushels of soybeans. If they do so, only about 40 million bushels will remain to go into the carry-over or be shifted to other oilseed crushing areas. But to insure the necessary capacity operations, processing margins must be

maintained. This is being handled by the CCC through purchases of approved varieties at prices guaranteed last winter and releases of beans to the processors at price levels necessary to keep processing plants in full operation. The necessity for this operation arises from the existence of ceiling prices on soybean oil and from the necessity of pricing soybean meal so as to encourage an increasing use of it by livestock feeders and poultrymen. It helps at the same time to relieve the soybean storage situation.

Sharing Fertilizer Materials

Approximately 15 percent of our national agricultural production results from the use of fertilizer. Our consumption of fertilizer in 1941 was 9,264,000 tons, distributed among a wide variety of crops, in all sections of the country. The greatest concentration in the use of fertilizer was in Southern and Atlantic Coast States.

War has affected our supply of fertilizing materials and our need for them. Many of the materials used, either in the process of making fertilizer, or in the fertilizer itself, are high-priority war materials. Moreover, the hauling of fertilizer materials and manufactured fertilizers requires rail, water, and truck transportation. That is one side of the picture.

On the other side is the fact that our production goals call for more crops and products that require fertilizer. To maintain average crop yields and quality on the increased crop acreage takes heavy applications of fertilizer for many crops. Fertilizer is a definite factor in determining agricultural production, and its role in our war efforts cannot be disregarded. Our position with respect to three fertilizer materials, nitrogen, phosphoric acid, and potash, emphasizes this role.

The potash situation is very different now from what it was during World War I. We depended then on imports for nearly all our supply of potash. This dependence was reflected in the price. Large domestic sources have now been developed and can meet adequately our probable demands. But transportation difficulties have arisen. Normally, most potash materials move to eastern points by boat from Texas City on the Gulf of Mexico. The current reduction in coastwise shipping, however, forces us to move them mostly by rail. Rail transportation, besides costing more than shipment by water, puts an additional load on heavily burdened railroads.

Our supply of phosphate fertilizers is more dependent upon war activities than it was in World War I. Sulfuric acid, necessary in producing superphosphate, is used on a large scale in war plants, but it can be returned later as spent acid and used in that form in superphosphate plants. There was no shortage of superphosphate in 1942, and supplies of sulfuric acid should be adequate for normal superphosphate production in 1943. The demand for treble superphosphate has increased during recent years. Only limited quantities, however, can be manufactured. Moreover, a considerable quantity will be needed for export, and the export requirement will probably reduce the amount available for domestic use. Yet production of superphosphate should be adequate here for normal requirements, provided no insurmountable transportation problems occur. Phosphate rock, like potash, ordinarily moves to a considerable extent in coastwise ships to eastern plants.

The nitrogen situation is less encouraging. Many nitrogen materials have "gone to war." Sulfate of ammonia and animal and vegetable organics, which are in most cases unfit for animal feeds, are our only dependable supply of nitrogen. Chilean nitrate can be produced in adequate quantities, but is dependent on ocean shipping. Nitrogen is important in the production of many crops. Our increased production of oilseed crops, such as soybeans and peanuts, will permit the production of large quantities of oilseed meals. If not used for livestock feed, these oilseed meals will provide much organic nitrogen suitable for fertilizer use. Yet the supply will be insufficient.

Most fertilizer plants had sufficient nitrogen in 1942 to manufacture mixed fertilizers, although toward the end of the season some of them had to eliminate high-nitrogen grades. Nitrate of soda was under allocation to industry during the spring season; the supply for agriculture was only about 70 percent of normal requirements. The situation for 1943 is no brighter. Some way must be found to insure the future use of the limited nitrogen supply in areas and on crops where it will be most helpful to the war effort.

CALCULATING FERTILIZER REQUIREMENTS

Agriculture's fertilizer requirements can be calculated in two ways: (1) By determining the amount needed to maintain yields on a normal basis; and (2) by correlating farmer expenditures for fertilizer with farm prices and farm income by geographic regions for a past period of years.

With a rising price level and a strong demand for crops, normal requirements can be expected to be more nearly shown by the second method of calculation than by the first. But to achieve the production goals, the first calculation is essential. Fertilizer supplies must be distributed on the right crops if we wish to avert serious maladjustments in production. Minimum requirements for 1942 were calculated at 375,000 tons of nitrogen, 736,000 tons of phosphoric acid, and 395,000 tons of potash. These amounts were probably exceeded; yet some of the vital war crops did not get enough nitrogen fertilizer.

Studies by the Department have shown approximately what part of the production of individual crops can be attributed to the use of fertilizer. They have included information from State experiment stations on the effect of fertilizer on crop yields, the acreage of crops fertilized, and the average farm rates of application. Crops like tobacco, potatoes, vegetables, and fruits depend more on fertilizer than do crops like corn and wheat, which grow principally in areas where little or no fertilizer is used. Cotton and corn in Southeastern States are the principal consumers of nitrogen fertilizer. Large amounts are used on vegetables in the Atlantic and Gulf coastal areas and on citrus and other fruits, especially apples and peaches.

DISTRIBUTION OF FERTILIZER MATERIAL

Several major problems beset the proper distribution of fertilizers in the light of present needs and difficulties. They involve ways to (1) ease the transportation load; (2) provide the proper amounts

of nitrogen in mixed fertilizers and for sale as straight materials; (3) meet changes in available types of material; (4) provide the fertilizer needed for vital war crops and curtail the use of it on other crops; and (5) reduce consumption for nonessential uses.

Filler materials are necessary to condition and manufacture nonacid fertilizers. Excess filler, moreover, adds tonnage to the fertilizer transportation load. It can and should be eliminated. Government and the fertilizer industry are determining ratios and grades which can be manufactured without excess filler and which at the same time will meet crop requirements on different soil types in different States and regions. Probably more than 500,000 tons can be saved in this way at a saving to the farmer, the manufacturer, and the national transportation load. The program eliminates the use of low-analysis fertilizers that contain less than 18 to 20 units of plant food.

Some crops best use most of their nitrogen in mixtures with P and K—phosphorus and potassium. Other crops require their nitrogen straight as top dressing applied sometime during the growing season. Buying P or K with nitrogen, in a mixed fertilizer, is uneconomical if the crop requires only nitrogen. Limited supplies must be allocated so that the shortage will be no greater for top dressing than for mixed fertilizers. Nitrogen materials are so important in the war production program that many of them, such as ammonia liquors, synthetic nitrogen, urea, uramon, etc., are not now available for use in fertilizers. Their place must be filled if possible; and farmers must share the available nitrogen with the men on the firing line.

Farm Labor Supply

Farmers are achieving their record production in the face of serious and increasing manpower problems. Labor shortages are keeping both the quantity and quality of the farm production from being as high as it might be otherwise. They present difficult problems in labor distribution. Agriculture has to share the labor supply with the military services and with industry so as to produce the best total war result. This Department, in cooperation with the War Manpower Commission, the Selective Service System, and the United States Employment Service, is doing what it can to economize the labor supply, to place it where it will do the most good, and to help farmers use it well. Yet the outlook for 1943 is critical.

Loss of many skilled year-round farm hands has compelled farmers to reduce their standards for hired help. They have special difficulty, particularly in the Northeast, in getting skilled dairy hands. Some dairy farmers are reducing their herds. A recent sample survey in 567 counties indicated that agriculture has lost more than 1,600,000 operators, family workers, and year-round hired workers from its labor force to nonfarm employment and to the armed forces since September 1941. The average number of persons employed in agriculture during 1942 as compared with 1941 has been approximately maintained, but only through increased employment of persons not normally in the agricultural labor force—nonfarm women, children, and relatively inexperienced workers.

How many less-qualified workers it takes to replace experienced workers is uncertain. Even though numerically these workers can be replaced, the replacements cannot adequately fill the place of skilled year-round hands. Available inexperienced workers do not have the strength and skill required. Farmers use other means also to get their work done; they put in longer hours, pool labor and equipment, defer some of the less urgent farm jobs, and improve their farm management. These procedures help materially to increase the output, but counteract the growing shortages of experienced farm labor only to a limited extent.

This Department, with the farm labor experience of World War I as a guide, has taken various steps. It has established working relationships with other public agencies whose programs affect the labor supply, cooperated closely with the Selective Service System, and furnished Selective Service agencies with information about farm manpower requirements. It has assisted the United States Employment Service in preparing a list of essential agricultural activities and occupations, which is now part of an over-all list of essential activities and critical occupations compiled by the United States Employment Service at the direction of the War Manpower Commission. The Selective Service Boards use this list in making occupational defer-

ments, and the United States Employment Service uses it in referring workers from less essential to more essential activities.

Such procedures, however, do not go far enough. Accordingly, an over-all plan has been developed to stabilize the employment of workers, including operators and unpaid family labor, on dairy, livestock, and poultry farms. It provides deferment for key workers on these essential farms, and requires also that the armed services and industry shall refrain from recruiting deferred farm workers. It also includes a program for recruiting, training, and replacing farm labor.

Involved in the operation of this program is the problem of farm wages. Farmers cannot match industrial wages dollar for dollar. Moreover, wage standards on dairy, livestock, and poultry farms vary widely among areas and among farms. Farm income is now high enough to enable many farmers to pay reasonably good wages, and reports indicate that adjustments are rapidly being made. But solution of the wage-differential problem is not yet in sight.

Agriculture is gradually getting a better distribution and utilization of its labor supply. The United States Employment Service promotes this change, through procedures from which both farmers and farm workers benefit. Shortages of labor in some areas have an offset in surpluses elsewhere. Placement through the United States Employment Service helps to level the inequalities and bring workers and jobs together. Lack of transportation facilities, particularly of gasoline and of tires, is a difficulty. In some areas the railroads have granted lower train rates for farm migrants, and farmers have received Federal aid in transporting a number of seasonal workers. Up to 200 miles they pay the transportation costs themselves; the Farm Security Administration, to the extent that the funds available allow, takes care of the additional mileage. Farmers who receive this assistance agree to provide fair wages and living conditions. The Farm Security Administration also maintains camps for migrants and provides other housing facilities.

The Selective Service System has authorized the voluntary employment of conscientious objectors on farms. Arrangements have been made with the War Relocation Administration for the seasonal employment of several thousand Japanese evacuees. Various agencies cooperate with the State and County USDA War Boards in getting the services of school youth for harvesting. Farm and community groups cooperate with State educational officials and with the United States Employment Service in placing school and college youth on farms. Some areas have formed Boys' Working Reserve organizations. Many school boards have adjusted their school vacation periods to coincide with harvest periods. These and similar measures will be in greater demand in 1943.

The Government has agreed with Canada to permit the flow of harvest machinery and crews across the border between the States of Minnesota, North Dakota, Montana, and Canada's prairie Provinces. The agreement has also facilitated the movement of potato pickers between Maine and New Brunswick. Under an arrangement with Mexico, which establishes conditions for the transportation of Mexican workers into the United States, for the maintenance of their wage levels and working conditions, and for their eventual return, the Department,

through the Farm Security Administration and the United States Employment Service, has recruited farm labor from Mexico for some areas.

Some manufacturers of farm machinery have offered training in the operation, maintenance, and repair of farm machinery. Banks, stores, and other businesses in some areas have set a precedent of closing for days at a time and releasing their employees for emergency harvesting. Sections in the Pacific coast area and in the Mountain States have pioneered in this procedure. Other cooperative activities have stretched the available supply of farm work power and saved time, labor, money, and crops.

FARM LABOR OUTLOOK FOR 1943

All this, however, is only a beginning. Evidence accumulating daily indicates that the situation is becoming serious. During 1943 it will be necessary increasingly for farmers to utilize the scarce supplies of labor, machinery, and transportation facilities only for production of the commodities most necessary to the war effort. Labor situations vary greatly from one area to another in the types of workers and skills required. The problem of the year-round hand is different from the problem of seasonal help. But we still have some unused manpower to help meet both situations. Greater utilization of underemployed farmers and farm workers is practicable.

Experience gained in 1942 indicates the feasibility of recruiting these workers and of placing them on more productive farms, either as operators or wage workers. They constitute a vast group of trained farmers, who should have an opportunity to do their part in the war program. Providing this opportunity presents economic, sociological, and psychological problems, but these problems should not be insurmountable. It is necessary also to draw more on sources of labor not normally employed in agriculture, such as nonfarm women, school youth, and part-time and emergency workers in nonfarm activities. Much has been done already to utilize these sources; much more can yet be done, especially through a Nation-wide approach to the problem of organizing and using these workers.

One lesson of our 1942 experience is that these programs require complete cooperation among farm employers, farm workers, agencies of the Department, the United States Employment Service, the Selective Service System, and all other agencies whose activities affect the supply of farm labor. This is the only way to get positive integration of all labor-placement programs and reach with them each community, neighborhood, and farm. There is no single solution to the farm manpower problem.

It seems likely that some form of wage control will be necessary to narrow the differential between farm and industrial wages. Wage controls obviously are preferable to any form of labor draft system, such as exists in the enemy countries, and the price control we have for farm commodities makes wage control almost a necessary counterpart. Letting farm labor be drained away through competitive bidding threatens failure in the Food for Freedom drive.

Farm workers look for factory jobs because industry offers them more economic security and more social stability, as well as more pay. City workers have many advantages which farm workers do not as yet enjoy. Besides relatively high wages, they have social security legislation, fuller employment, better housing, and collective bargaining. These differentials did not create a farm labor shortage before the war, because farm workers then had not much chance to get factory jobs. But they can move easily into industrial work now; so the need for lessening the inequalities is acute. Some men leave farm work because they think other jobs have more war value. We must impress on farm workers the importance of their contribution.

Farm employment conditions have changed already. Farm wages per day without board on July 1, 1942, averaged $2.45 as compared with $1.62 on July 1, 1940, and $1.98 on July 1, 1941. Fair minimum-wage rates have been assured to sugar-beet and sugarcane workers under the Sugar Act of 1937. Underemployment, formerly chronic in many rural areas, has been reduced considerably. The Farm Security Administration has provided better housing for many agricultural workers. Many farmers have kept their workers by offering them more continuous employment, better wages, and better housing. Farm labor conditions should be improved; but the pull of much superior urban conditions is a serious agricultural handicap.

This disparity has a long-run phase. In the 1930's we had a surplus of rural population, which industry could not absorb. Along with the seasonality of farm work, it caused low farm wages, unemployment, underemployment, bad rural housing, and bad rural sanitation. The war is not a permanent remedy. On the contrary, an excessive draft by the cities on the farm labor supply may set the stage, when the war is over, for return of the difficulty through a big trek back. Measures to put nonfarm and farm working conditions more nearly on a parity and make them more stable would be some protection. Fundamental adjustment in the post-war economy must provide nonfarm opportunities sufficient to relieve agriculture of again having to support a disproportionate number of the Nation's workers.

Programs for small, low-income farmers who do not have enough productive work to do, could help them to: (1) Increase their acreage, and improve the efficiency of their production of crops needed; (2) get livestock, such as gilts for breeding, baby chicks, cows headed for slaughter which are still fair producers, and heifer calves which would otherwise be vealed; (3) pay operating costs during the production season so crops and livestock need not be sold until ready for sale; (4) buy feed and seed; (5) buy fertilizer and limestone; (6) buy implement and machinery repairs; and (7) buy work stock.

Such programs would involve loans but not large loans. Suitable aid to low-income farmers for the 1943 season would probably require loans of about $350 per farm, or a total loan fund of about $300,000,000. New war food which these low-income farmers could produce in 1943 if they received the aid necessary would amount in value to considerably in excess of $300,000,000. It would guarantee substantial loan repayments within a 2-year period—and would add measurably

to the Nation's supply of essential foods in 1943 and each year thereafter. Briefly, it would be a sound national investment.

Small farmers who already are on the land can do much to increase our food supply. There are well over 1,200,000 farm families who do not have many acres, who do not ordinarily market much in the way of food products, and who have small incomes. The Department has been working to help them. Though the Farm Security Administration has been making loans to low-income farmers and assisting them in other ways, thus far it has been able to help less than half the number. Most of those not yet reached are eager to take part in the Food for Freedom program. Chiefly they need working capital and guidance.

Economists have estimated how much more food of various kinds the families which have not been reached could raise annually if all of them received small loans and technical guidance. The figures are surprising—about 1½ billion pounds more milk, about 180 million dozen more eggs, and about 400 million pounds more pork and lard. Such quantities, had they been produced this year, would have accounted for large parts of the increased production needed; for example, for 17 percent of the increase in milk production asked from all farmers; for 18 percent of the increase requested in pork and lard, and for over one-third the increase needed in eggs.

Most of the families on our smaller farms do not have the equipment and livestock and other things necessary to use the family labor which they have available. Hence they cannot make the best use of their land. Probably three-quarters or more of the small-farm families cannot fully utilize their manpower. For example, the small farmer who has 2 cows can milk 4 just as easily. The small farmer who usually raises 10 pigs would have no labor problem in going up to 20 or even 50 pigs. Multiplied by a million farms, such increases might even burden our distribution machinery. But of course the maximum theoretical increase is not possible, and we could use more than we are likely to get.

HALF BILLION MAN-DAYS WASTED YEARLY

Approximately a half billion man-days of potentially productive labor is being wasted each year on farms in the United States, more than 80 percent of it on the 2,400,000 low-income farms whose gross farm income in 1939 was less than $800. There is considerable waste of manpower also on the 485,000 low-income farms with products valued in 1939 at between $800 and $1,000, and some waste of labor on the medium-income farms. About 40 percent of the labor on farms that yield a gross income under $800 is unused; about 25 percent of the labor on farms that yield a gross income between $800 and $1,000 is unused. These income groups compose about 60 percent of the farm families in the country.

Labor shortages occur on many high-income commercial and large-scale farms, but the wasted manpower on the small farms cannot usually be transferred to the labor-deficit farms. It is available for the most part only on the "home place" in the form of hours

made idle by the lack of adequate resources, organization, training, and other production factors. Though our agricultural plant gives employment varying with seasonal conditions to between 8 and 11 million workers, it provides full employment on less than half of the Nation's farms.

Limitations due to the size of the farm, or to lack of machinery and livestock, result widely in farm operations in which great activity alternates with partial or complete idleness. Lack of resources, equipment, training, and credit for small farms gives us the paradox of rural underemployment and labor shortages simultaneously. Unused manpower in United States agriculture, estimated at from 400 to 600 million man-days of labor per year, will remain largely unused for the duration of the war unless we do something more to tap it and will handicap us in striving toward the production goals.

In certain sections of the country the underemployment is much heavier than in others. Almost one-half of the idle labor is in the cotton-producing States. Studies made of small cotton farms show that the typical two-mule farm uses only some 2,300 man-hours of the total available 4,080 man-hours. Similar situations exist in other areas, notably in the Appalachian and the Ozark areas.

Migration into war industries reduces the rural unemployment to some extent, especially among the younger agricultural workers. But lack of training and education among rural people, the distance of defense industries from the farms, the lack of facilities for moving, and other handicaps probably prevent the migration from greatly alleviating the problem.

RURAL MIGRATION

From mid-1940 to mid-1942 the gap between our labor potential and the number of persons working or in the armed forces narrowed by more than one-half. Between May 1940 and May 1942 employment rose by more than 5 millions, entirely apart from the growth of the Army, the Navy and the other fighting services. Our war effort may require the full utilization of our labor potential by 1944, in which year there will be available for employment or for service in the military establishment some 61 millions of our population.

In recent years about 1 worker in every 5 in the United States has been employed in agriculture. If our armed forces should reach in 1944 a total of 10 million men and these should be drawn in the same proportion from all walks of life, one-fifth of that total, or 2 million men, would be drawn from the Nation's agricultural labor force of operators, family workers, and hired men. This is of course hypothetical. But the hypothetical example reminds us that agriculture may expect a substantial transfer of its manpower to active service.

Moreover, rising employment in war industries exerts a pull on farm laborers, farm tenants, and other rural people. Many of them find the employment opportunities extremely favorable in comparison with what they could expect in agriculture. Hence agriculture faces a manpower curtailment of very significant proportions, though its farm production must be maintained at the highest level in our history,

and in fact raised substantially above the current volume in many lines. In consequence most of the people formerly unemployed or underemployed in agriculture have wartime employment opportunity in generous measure. Migrants can move purposefully to jobs on farms or in factories or in war servicing.

Net migration from farms to towns and cities during 1941 was approximately 1 million persons, a yearly figure which has been exceeded only once since 1920. Some farm workers took jobs in industry but continued to live on farms. Some part-time farmers devoted more of their time to nonfarm occupations. Many a farm operator had difficulty in finding a hired hand to replace his son who had gone to the city.

Ever since the disappearance of the free land, nonfarm and urban segments of our economy have called a large proportion of our farm youth. Each year some 650,000 young people on farms reach maturity; only 350,000 are needed to replace older farm persons who die or retire. There was a backlog in 1940 of 2,500,000 persons on farms who would not have been there had migration continued at the rate that prevailed in the 1920's.

Lend-Lease and Other Distributing Operations

Activities of the Agricultural Marketing Administration have contributed to the war effort on all fronts where allied military and naval forces have been in action, as well as at home and among the civilian population of the United Nations. Domestic distribution has helped low-income persons who are eligible for public assistance in the United States and Puerto Rico. The plan supplies only a minimum of food requirements; yet it promotes morale and plays a part in preventing disease, malnutrition, and lowering of productive capacity.

These AMA programs support farm prices and consequently aid farmers to meet their war production goals. They also promote orderly marketing of farm products in line with the best interests of consumers and of the Nation. They synchronize production with distribution. Lend-lease purchases of food; the food-stamp, school-lunch, and direct-distribution programs; the school-milk and the cotton programs; and the Victory Food Special programs, along with marketing services and market regulatory work, are complementary in their effects and speed farm products to their uses.

The United Kingdom and other parts of the British Empire have so far received the bulk of the lend-lease commodities purchased by AMA during the past year. In recent months procurements for other nations have been important also. Lend-lease foodstuffs, such as Army biscuits, canned salmon, canned meat, dried eggs, flour, dried fruits, and orange juice, are appearing on major battle fronts as weapons in the defense of the United Nations. Food shipments have gone to Russia and China for military and other uses; also to Polish refugees in Russia. These shipments have included concentrated soup, milk products, meats, fats and oils, beans, cocoa, and ascorbic acid (pure Vitamin C). In cooperation with the International and American Red Cross, AMA is shipping similar items to supplement the meager diet of Yugoslav prisoners in German and Italian concentration camps. The Soviet military and scientific outposts in northern Siberia are receiving quantities of lend-lease foodstuffs.

Many of our island outposts have benefited similarly. Under the Territorial Emergency Program the AMA has purchased more than 100,000 tons of agricultural products for shipment to Hawaii. Puerto Rico, an important base for our antisubmarine patrols, will soon receive rice, canned meat, flour, and fish products for its civilian population. AMA has cooperated with the Department of State in providing emergency food reserves on such Caribbean Islands as Trinidad and Antigua where United States naval bases are being constructed.

Probably the coming fiscal year will witness important changes in commodity purchases for the United Nations. Loss of allied territory,

the reoccupation of lost territories, occupation of enemy possessions, changes in the shipping situation, and new allies will create fresh problems which, however, should not present unsurmountable obstacles. Equally difficult problems have been overcome during the past year.

AMA DOMESTIC DISTRIBUTION OF SUPPLIES

In the fiscal year ended June 30, 1942, the AMA domestic food-distribution program involved an expenditure of 166 million dollars. The total case load decreased as the result of an increase in industrial activity. Dovetailed into our war effort, the food-stamp, school-lunch, school-milk, and direct relief distribution programs served the farmer as machinery to supplement and support the regular commercial distribution of abundant crops and helped to build stronger Americans.

The volume of blue-stamp issuance for the fiscal year 1942 amounted to approximately 111.6 million dollars, as compared with 82.8 million dollars during the 1941 fiscal year. Participation declined moderately but blue-stamp issuance per participant rose from $2.62 in July 1941 to about $2.85 in June 1942.

The School Lunch Program was extended greatly. It reached an average of more than 4 million children and a peak of 6.2 million children in 93,000 schools in February and March. About 455 million pounds of foodstuffs, which cost 21.9 million dollars, were distributed by AMA through school lunches during the fiscal year. The number of schools that serve complete lunches rose sharply. More than 75 percent of the participating children received complete hot or cold lunches. The number of children fed under the 1942 summer lunch program was larger than in any previous year, and foodstuffs were made available more widely to children's summer camps and other nonprofit child-welfare centers. Operation of the School Lunch Program is largest in the Southern States. Almost 50 percent of the children who participate live there. Approximately 60 percent of all participating children are in rural areas.

In the direct-distribution program the number of persons participating declined from 5.6 million in July 1941 to approximately 3.2 million in June 1942. Causes of the decline included reemployment, seasonal factors, recertification of the case load, and transfers to the food-stamp programs. Nevertheless, AMA expended a total of 28.3 million dollars during the year for the direct distribution of 822 million pounds of foodstuffs to needy families.

Operated in 6 large urban centers during the fiscal year, the relief milk program served approximately 140,000 families a month. The subsidy paid under this program amounted to approximately 2.4 million dollars. The school-milk program was expanded from 8 to 82 operating areas during the last half of the fiscal year. At the close of the school year in May, approximately 725,000 children received milk through it; the monthly average for the year was approximately 455,000. The cost for the fiscal year was approximately 1.5 million dollars; a total of 24 million quarts of milk was distributed. It will be extended during the fiscal year 1943 primarily to rural and urban areas of not more than 10,000 population, so as to give the widest

possible coverage and distribute available funds among regions and States more equitably.

The cotton-stamp program, which served from 250,000 to 300,000 persons a month during the year, was discontinued in all areas in April and May 1942. The cotton-mattress program furnished nearly 1.4 million mattresses and more than 1.2 million comforters to needy families. More than 1 million producers participated in the Supplementary Cotton Program, which was carried on with 1941 fiscal year funds and completed on April 15, 1942. For reduction in their cotton acreage these producers received approximately 17.7 million dollars.

SPECIAL MARKETING PROGRAMS

In March AMA started the Southern Egg Marketing Program to provide egg producers with a supported cash market in the season of heaviest production. It designated public refrigerated warehouses as buying agencies. These warehouses bought the eggs in lots of 10 cases or more from farmers, cooperative organizations, small dealers, and storekeepers, and paid announced prices, based on not less than 85 percent of parity, for the grade of eggs purchased. The purchases were made on specified days each week, when Federal-State inspectors were on hand to grade the eggs. Operated under the initial announcement from March through June in North Carolina, South Carolina, Georgia, Florida, Virginia, Louisiana, and West Virginia, the program assembled 29,024 cases of eggs at a cost of $255,653.84. Under another program AMA purchased eggs of U. S. No. 4 standard grade or better in lots of 100 cases or more. In other States, U. S. No. 1 standards or better were bought in carlots.

Great abundance of certain foods resulted from the record farm production and especially of perishable fruits, vegetables, and poultry. There were momentary oversupplies of such processed foods as cheese and evaporated milk. To focus attention on this abundance and to create a demand for it, the AMA initiated the Victory Food Special program. The purpose was to divert consumption from foodstuffs needed for war purposes into the abundant lines and at the same time to assure a wider market distribution of the latter for farmers and processors. Organizations of producers, processors, wholesalers, and retailers cooperated in this merchandising program. Trade groups, with advance notice of drive dates, reached out into producing areas during harvest peaks or dipped into the stores of processed food. Food writers and radio commentators kept the public informed. The result was an appreciable shifting of consumer demands from lines of relative shortage to lines of relative abundance.

MARKETING FACILITIES AND METHODS

Reaching our farm objectives will pose some critical marketing problems. The war has entirely upset the usual demand situation. It will be extremely difficult to calculate precisely the amounts of each kind of food and clothing needed. We must be especially careful not to encourage greatly expanded production in areas without the necessary facilities for processing, storing, and shipping. Mistakes

will probably be made in estimating total requirements and the amounts needed in each area. The agricultural goals may call for more of some products and less of other products than we really need. This is partly because it is impossible to forecast accurately the trends of military and political developments during the war and the effect these trends may have on requirements.

Another major difficulty is that the effective demand for our products will depend greatly on the ocean shipping situation. The Department could have supplied substantially greater amounts of food for lend-lease purposes during the past year if shipping had been available. We cannot judge our requirements without taking into consideration the probable availability of shipping. This makes a particularly difficult situation because we must not be overpessimistic about sinkings or about the rate of new construction. If we should overestimate sinkings and underestimate new construction, we might fail to produce things which could make important contributions toward victory.

Not all of our wartime marketing troubles will be in ocean shipping. Plenty of trouble spots are developing here in the United States. We need new market outlets in many areas which are just coming into commercial production. We need a comprehensive program for getting the fullest possible use of our transportation facilities, including the railroads and trucks. We must get along with fewer and less expensive packages for many farm products. We must make better use than ever before of our storage facilities. We will need to make substantial improvements in the wholesaling and retailing of foods in our cities. With all these and other marketing problems we must deal effectively if agriculture is to accomplish its objectives.

COMPREHENSIVE PROGRAM NECESSARY

These problems can be met only by a vigorous and comprehensive marketing program, which will involve a considerable amount of over-all planning and direction by the Government. The British Government has found it necessary practically to take over the distribution of foods. No such extreme program will be needed in the United States. Our situation is quite different from that in England. We normally import very little food, while England relies mainly on imports for her food supplies. Yet, even in the United States we have found many kinds of Government controls necessary in wartime. Already we have several forms of price control, some rationing, and some allocation of scarce materials. Such controls are likely to be more far-reaching before the war is over. Probably most farmers, dealers, and consumers understand the need for such regulations during wartimes, and realize that we must take whatever steps are necessary to insure the most effective use of our facilities for producing, transporting, processing, and distributing foods.

It perhaps would be well to remember some of the marketing developments in World War I. That war brought about three fundamental changes in agricultural marketing. First, it was necessary

to set up national standards, grades, and inspection services for the major farm products. Second, a Nation-wide market news service was established to meet war needs. Third, standards for fair trade practices were found necessary and the machinery was set up for enforcing them.

It is hard for most of us to remember the chaotic marketing conditions which existed before World War I because of the lack of grades, market news, and fair trade laws. These have become cornerstones in our marketing policy during the past 25 years. They are almost universally accepted as necessary parts of our marketing system. As a matter of fact, they had been advocated for a generation by farm leaders and by many trade groups. Yet it took a major war to bring them about.

In recent years the Department has had a good deal of experience with a number of marketing programs. They include the marketing agreements and orders, the several programs for making surplus foods available to school children and low-income families, the Ever-Normal Granary for storing surpluses, and, since the beginning of the present war, the lend-lease program and a recently inaugurated program for Victory Specials to promote greater distribution and consumption of surplus foods. These programs have given the Department some practical experience in handling marketing problems. They have also showed that it is possible in many cases for the Government to work closely with farm organizations and with trade groups.

The job of marketing agricultural products involves a good deal more than providing services such as market news and inspection and enforcement of fair methods of competition. These are important parts of the program, but in themselves they fall far short of a complete marketing program. Necessary also is the development of the most efficient possible means for assembling, transporting, processing, storing, wholesaling, and retailing these products. It also includes the development of whatever forms of distribution may be necessary to insure that farmers have outlets for their products at reasonable prices and that all groups of consumers get at least a decent minimum of foods and clothing.

Many studies show that by reorganizing routes in the country assembly of milk, 40 percent of the truck mileage can be eliminated without interfering with producer-dealer relationships. Larger economies are possible in city distribution. Similar savings can be made in the trucking of other farm products. The truck is vital to the distribution of farm products. The marketing system is built around it. Nearly all products move from the farm to the first market, assembly, or processing point by truck.

Fully one-third, perhaps more, of these products move from these country points to the distant city markets by truck, and nearly all distribution from the city wholesale markets to retailers and consumers is a motor-vehicle operation. These trucks must be kept rolling or the farmer and consumer will suffer. With larger production to be moved and a steadily dwindling supply of trucks to move it, the only answer is more efficient use of each vehicle.

The Year's Production

The year 1942 is likely to be long remembered as a banner year for farm production in the United States. To find a past season when weather conditions were equally favorable, one has to look back to 1920 and 1915, and to the generally favorable period in the early years of the century.

Crop production in 1942 was probably 10 percent more than it would have been with weather no better than the 50-year average. Much of the increase was in the Great Plains States, where exceptionally favorable moisture conditions increased plantings, reduced abandonment, gave outstandingly large yields per acre, and justified hopes for better-than-average crop yields in this area in 1943.

In yields per acre 1942 seems likely to rank far above any past year. Indications on October 1 were that the yields would be 13 percent greater than those of 1941, the previous record year, and 14 percent and 16 percent higher than those of 1940 and 1937, the next highest years. Even higher yields would have been obtained had the growing season for sorghums, soybeans, beans, and late fields of other crops not been cut short by exceptionally cold weather in late September, accompanied by frosts over nearly the whole area from the Canadian border down to the southern borders of Colorado, Kansas, Tennessee, and Pennsylvania.

Crops now expected to show record high yields include: Corn, wheat, rye, cotton, hay, beans, peas, potatoes, and various fruits and vegetables. Oats, barley, sugar beets, sugarcane, and tobacco are expected to show yields that have been exceeded only a few times in the last 50 years. With the possible exception of peanuts, which have been heavily planted this year in new areas, no major crop is expected to give a less-than-average yield.

The record yields, on the largest acreage in 10 years, give a production beyond all expectations. Practically all States are sharing in the abundance. Production will be a record in grain, in hay and forage, in beans and peas, in oilseeds, in sugar and sirup crops, in fruits, in canning crops, and in commercial vegetables for market. Output of cotton, tobacco, and potatoes, because of the very small acreages grown, is well below top figures of past years, but all these crops show record or near-record yields per acre. Probably the production of them is adequate under present conditions. Altogether the crop production is expected to exceed the average annual production during the 1923–32 or predrought period by 27 percent. Last year's production was 11 percent above the predrought average; in 1940 it was 8 percent above; in 1937 it was nearly 13 percent above. In no other year has it been more than 6 percent above.

Exceptionally favorable moisture conditions in the Plains States were a major factor in raising the yield of wheat to an average for

the United States of 19.5 bushels per acre—2.6 bushels more than the previous high record established in 1941. The estimates indicate a total wheat crop of about 984,000,000 bushels, only 2 percent below the record production harvested in 1915. The yield of corn is expected to be 35 bushels per acre, or 3.3 bushels more than the previous high record established in 1906. Corn production is expected to exceed 3 billion bushels for the third time on record, and with good harvesting weather it is likely to exceed even the big crops of 1906 and 1920, the largest up to this time.

Oats averaged aout 36 bushels per acre, a yield exceeded only twice since the Civil War. Production of this crop is now estimated at nearly 1,370,000,000 bushels, which would exceed production in any year since 1925. Barley, grown on nearly 17,000,000 acres or 3,000,000 acres more than in any year prior to 1941, gave a high but not exceptional yield per acre and a production estimated at 426,000,000 bushels—67,000,000 bushels more than in the most favorable season of the past. Rice and flaxseed, on greatly increased acreages, gave yields lower than in a few past seasons, but the volumes of rice and flaxseed harvested are by far the largest to date.

Oilseeds made the most spectacular showing. Farmers planted record acreages of soybeans, peanuts, and flaxseed and are obtaining record crops. Production of cottonseed will also be fairly large. The total production of these four oilseed crops is expected to approach 15,000,000 tons, or about 40 percent more than the quantity harvested in any past year.

Hay and forage production was a record that may stand for some years. Substitution of alfalfa and soybeans for lower yielding kinds of hay increased the hay production in some areas, but well-distributed rainfall was the chief reason for the high yield of hay. A large tonnage of sorghum forage is also in prospect. With only about half as many horses and mules on farms as during the first World War, farmers will be able to feed hay liberally to their work animals and to their cattle and sheep and still have a near-record carry-over of hay next spring.

Some of the conditions that favored crops also favored the production of livestock and livestock products. Liberal rainfall in 1941 helped western and southwestern ranges to recover from the drought years. It has recently been very dry in parts of the far Southwest, but moisture conditions were exceptionally favorable in 1942 over the central and northern parts of the Great Plains area. Carrying capacities of both western ranges and farm pastures have now recovered to about what they were before the drought period. For the whole period from May 1 to October 1, the condition of pastures averaged higher than in any previous year since 1920.

Feed-grain production in 1942 promises to be the highest on record. It will permit both further increases in livestock and liberal feeding per head, without drawing on our large reserve stocks of corn and wheat. The abundance of feed and pasturage, coupled with favorable livestock returns relative to feed costs, is aiding farmers to achieve new high records in the production of milk, eggs, chickens, hogs, cattle, sheep, and wool and to plan for continued heavy production of livestock and livestock products in 1943.

Preliminary surveys of acreages planted and harvested indicate that the acreage goals set for corn, oats, barley, flaxseed, rice, rye, soybeans for beans, and vegetables for canning have been exceeded by more than 6 million acres. Acreages devoted to cotton, tobacco, and wheat were limited by strict individual farm allotments. Crops which appear to have been grown on acreages smaller than those set by the goals were beans, peas, potatoes, sweetpotatoes, and hay. All of these, however, gave very large yields per acre.

Because equipment is scarce, the acreage of peanuts that can be harvested and threshed is still uncertain. It will probably be more than twice the acreage threshed in any past year and will include a large acreage in areas where the crop is new, though it will probably be below the very high goal that was set. Production of other oilseeds, however, was above expectations, and total oilseed supplies are about as large as can be readily handled.

The goals for hogs and cattle to be slaughtered in 1942, for the raising of lambs and chickens, and for egg production seem likely to be reached or exceeded, but the abundance of feed may cause farmers to hold back more heifers for breeding purposes than seemed desirable a year ago. Milk production will hardly reach the original goal but appears to be sufficient in view of the shift in lend-lease demand from evaporated milk to the more concentrated dry skim milk.

On the whole, the 1942 production of crops and livestock shows a remarkably close adjustment to national needs.

Victory Gardens

Probably more than 15 million families in the United States this year cared for some kind of Victory garden, large or small. At least 5 million farm gardens were tended this year, many of them bigger and better than ever before. In towns and suburban areas some 10 million gardens were planted and earnestly cultivated. Vegetables for Victory had real meaning for town gardeners, whether they made contacts with soil and plants in home yards, in community gardens, or in some school garden space. Yet town and city people observed the injunction not to waste seeds or garden supplies and labor on crowded, infertile sites. By and large, imprudent backyard gardening did not develop.

Our farm gardens helped much in increasing farm family food supplies. Farm people canned and preserved for winter use good harvests of health-building vegetables and fruits. The ornamental side of gardening, the planting and care of lawns, flowers, shrubs, and trees was not neglected. Nurserymen reported a healthy interest among both rural and urban people in obtaining fruit and ornamental stocks. The year's sales of vegetable seeds indicated that the Victory-garden idea had been successful. Attention turns now to means of capitalizing these gains so as to build an enduring interest in gardening of all kinds.

As the basis of the Victory-garden program the Government recommended four points, which received the support of farm papers, garden and women's magazines, the metropolitan press, trade associations and papers, Federal and State agricultural agencies, the schools, garden clubs, and the horticultural world generally. The program was designed to meet emergency needs; to build up food supplies, particularly on farms; to meet long-time needs; and to encourage national awareness of the part home gardening should play in our lives. The four points were:

1. Good gardens on 5,760,000 of our farms, as an essential part of the Nation's Food for Freedom program. Farm gardens should contribute a much larger part to the farm family's living to promote health, save money, and lessen the drain on commercial stocks of processed vegetables for urban consumption and for lend-lease and military purposes.

2. Grow more fruits for family consumption on our farms and suburban homesteads. Rural people generally do not have enough fruit in the diet and won't have until they grow it at home.

3. Aid town and suburban vegetable gardening, including community plots, home gardens, and school gardens. Wherever open sunny space and fertile ground permit, home-grown vegetables can

add to the family supply of health-giving vegetables. School gardens, particularly when conducted to produce vegetables for school lunches, can contribute to health and education.

4. Maintain lawns, flowers, and ornamental plantings. There was no need to tear up ornamental plantings for the sake of growing a few vegetables, despite the patriotic urge to do so which some persons felt. People can help with patriotic and protective wartime measures and at the same time maintain the beauty of their home surroundings.

INTERAGENCY COOPERATION

This garden program began to take shape in 1941. The Department formed an interbureau garden committee, and the Office of Defense Health and Welfare Services appointed a committee on gardening to work with the Department's committee in developing a coordinated national-defense garden program. In December 1941 the two agencies joined in calling a national garden conference, at which nearly 300 delegates assembled. They included editors of garden magazines, women's magazines, and farm papers; writers of garden columns; and representatives of garden clubs, educational agencies, radio companies, and trade associations.

Many States subsequently held State garden conferences and formed committees to organize and plan garden campaigns. In some States, particularly in the South, the garden drive fused with the broader farm home food supply drives. The number of farm gardens increased remarkably. Preliminary estimates from 24 States picked at random showed that these States had 605,800 more farm gardens in 1942 than in 1941. The number of town gardens grew phenomenally; it doubled over 1941 in some States.

Members of 4–H boys' and girls' clubs played a great part in the farm-garden movement. Many of them had a Victory-garden project of their own; others took over the care of the farm family garden, or helped in caring for it. These farm youngsters can be depended on to give even greater help in the years to come. In towns the Boy Scouts made gardening a majority activity. The State extension services emphasized better, larger, and more adequate farm gardens, as well as more farm gardens.

Low-income families on marginal land can add substantially to their food supplies through gardening. Various agencies cooperated to strengthen their incentive. Nutritionists emphasized the role that green leafy vegetables, yellow vegetables, and tomatoes should play in the daily diet in providing more adequate supplies of the vitamins A and C, and also more calcium and iron. These foods relieve the half sickness which affects many undernourished people. Other specialists offered technical help.

What can be done when various interests and agencies join in a well-planned garden campaign appeared strikingly in Cass County, Minn., a cut-over county with much marginal farming and a large and persistent relief load. Something had to be done there to encourage increased home food production and to stimulate canning

and storage of food for the winter months. Too many families had either no garden at all or one that supplied only radishes, lettuce, and cucumbers for a brief period in the summer.

Launching of the Food for Freedom program in the spring of 1941 provided an opportunity for an all-out attack on Cass County's garden problem. Federal, State, and county agencies took part in it. In April a garden contest was announced, to which every county newspaper gave front-page space. Special letters containing a garden plan and recommended varieties of vegetables went to every Cass County family. The contest closed in December with a big county garden day. It appeared that Cass County gardeners had canned and stored food worth $378,000 at 1941 values. The average family of 6 canned 268 quarts, not counting pickles, jams, jellies, or meats. Some 3,000 families took part in the contest. They included 1,200 relief families (out of a total of 1,500) and 167 of the 200 Farm Security farmers in the county. Of the 87 gardens given high placings by judges, 39 were raised by families on direct relief or aided by the Farm Security Administration. Seven of the final winners were from these low-income groups. Similar cooperation marked the garden effort in many States.

The need for vegetables and fruits, in addition to other foods for our armed forces and allies, is becoming so great that Victory gardens will have still more importance in 1943. The Department recommends that every farm where the climate and the water supplies permit should produce the family's entire yearly supply of vegetables, for use either fresh or preserved. Thus the farm family will assure some of the food it needs, especially the health-protecting foods, and will relieve the strain on rail and highway transportation. It will also make more food available for our military needs, for our allies, and for our civilian population. Every farm and many suburban homesteads should grow strawberries, small fruits, and the more easily grown tree fruits. In towns and suburbs, wherever open sunny space and fertile ground exist, people should grow supplies of vegetables. It may be necessary, so as not to sacrifice lawns and ornamental plantings, to develop community or allotment gardens in some communities. Many town and city people can also take more advantage of local surpluses of fruits and vegetables, and do some of their own canning and preserving.

Cotton

Mechanized warfare uses many items of equipment made wholly or partly from cotton and cottonseed. Clothing and equipment for soldiers contain more cotton than ever before; cotton enters directly into other items of military equipment more than it did formerly; cottonseed and its various products make important contributions to the war effort. Cottonseed oil has importance which is generally recognized. Cotton linters enter into the manufacture of munitions and plastics. War uses have even been found for cottonseed hulls.

Our domestic consumption of cotton gained further impetus with the start of the national defense program and continued rising in the 1941–42 season, in which period it amounted to the record total of 11,172,000 bales, as compared with 9,722,000 bales in the 1940–41 season. Factors responsible included the defense and war-production program, which required the Government to make large direct purchases of cotton textiles and other products containing cotton; the improvement of business activity generally, and the associated rise in consumer incomes to record levels. Mills brought more spindles into operation; they ran more hours per day and more days per week. Effective capacity of the mills, rather than the demand for certain goods, was the chief factor limiting cotton consumption during much of the past season.

This increase in the demand had effects not measurable entirely by spindle activity. Military fabrics average heavier than those normally produced for civilian use, and in consequence mill consumption of raw cotton tended to increase somewhat faster than textile yardage. Moreover, the situation had definite implications as to grade and staple. The higher grades and longer lengths of cotton were more in demand. Ordinarily, higher-than-average quality cotton goes into domestic civilian consumption; the remainder moves largely through export channels. Military fabric requirements, however, specify even higher-quality cotton.

Also, the volume of raw cotton that can be handled with limited carding capacity is larger for high-grade than for low-grade cotton. There is less waste with the higher grades, and the machinery can handle them at higher speeds. As a help to mills in getting supplies of needed grades and staple lengths, the Commodity Credit Corporation started a general program in January 1942 under which it disposed of more than 1 million bales of Government-owned cotton.

Our cotton exports were small during the year, although greater than in 1940–41. The war made many countries inaccessible. Some countries still able to import cotton had small export outlets for cotton textiles, or competing needs for other lines of production. They had to shrink their cotton-textile industry through rationing and

strict control over imports. Moreover, exports from the United States met increased price competition from foreign growths.

The Government took three lines of action to improve the cotton situation and also help our allies: (1) The lend-lease movement; (2) the export sales program; and (3) subsidies on cotton exported to Canada.

Lend-lease shipments of cotton, which we started near the end of the fiscal year 1941, rose considerably in 1942 and helped eligible countries to meet their needs for American cotton. But the price disparity between American and foreign growths made it uneconomical for other friendly nations to obtain American cotton. To overcome this difficulty the Department in September 1941 announced an export-sales program, under which it sold 410,000 bales of Government-owned cotton for export at prices below those of the open United States market. Subsequently it supplemented the program with a subsidy on exports to Canada.

Production of cotton in the United States in 1941, on the smallest cotton acreage since 1925, was only 10,744,000 bales (500 pounds gross weight), the smallest since 1935. This quantity was well below the domestic disappearance. As a result, the carry-over of all cotton in the United States declined from about 12.2 million bales on August 1, 1941, to 10.6 million bales on August 1, 1942. The total supply was still adequate, except in the longer staple lengths. Accordingly, as explained in another section of this report, the Department urged increased production of long-staple cotton.

Growers increased the acreage of long-staple upland cotton and American-Egyptian cotton about as much in 1942 as the available seed supply permitted. The acreage of sea-island cotton declined, largely because the yields had been low in recent years and other crops more profitable. The production of long-staple cotton as a whole, however, will show a marked increase over that in 1941. Total domestic production this season, largely because of high yields, is expected to be more than 14 million bales, a 30-percent increase over that in 1941.

Farmers got a return from the 1941 crop larger than that from any crop of several previous years, although the crop was the smallest since 1935. Prices for both lint and seed were relatively high (96 percent of parity for lint cotton). Returns from the sale of lint were estimated at 914 million dollars, 47 percent above returns in 1940, and the highest since 1929. Returns from the sale of cottonseed were estimated at 192 million dollars, 96 percent above 1940 returns, and the highest since 1919. Total returns from marketings of the 1941 cotton crop, with Government payments included, totaled 1,292 million dollars, the largest since 1929.

Wheat in the War Economy

In the wake of Pearl Harbor, wheat continued to stand by itself as a surplus-problem crop even though war pressed its demands for greater production of virtually all other major crops. Through the months when war had been confined to other parts of the globe, wheat farmers had received a good preview of what was coming. Export opportunities that had grown smaller year by year since the 1920's were reduced to nothing. At the same time, good weather and conservation farming stepped up yields per acre for 4 successive years until in 1942 an all-time high was reached.

The record-breaking yields, plus the reduced exports, more than offset the acreage reductions farmers had achieved cooperatively through the Agricultural Adjustment Agency programs. The wheat carry-over jumped from 282 million bushels on July 1, 1940, to 633 million bushels on July 1, 1942. On top of this record carry-over came the 1942 crop of about 984 million bushels to give the United States approximately a 2 years' supply of wheat on hand.

Our wheat problem would have been much greater had farmers not reduced their wheat acreage in recent years through successive Agricultural Adjustment Agency programs. They seeded an average of only about 62 million acres under the programs for the 1939 to 1941 crops. This was a large reduction from the 81- and 80-million-acre seedings in 1937 and 1938, in which years there were no national wheat-acreage allotments in effect. As compared with the demand, nevertheless, the production has been much more than adequate. World trade in wheat and flour has been greatly curtailed under war conditions, and there is small prospect of early improvement.

On June 27, 1942, a Memorandum of Agreement on wheat became effective among the five nations—Argentina, Australia, Canada, the United Kingdom, and the United States. This international commodity agreement, the first to be negotiated with reference to the war and post-war period, has three main objectives, namely:

(1) To minimize the accumulation of excessive stocks of wheat. Record stocks of wheat are now on hand in the four exporting countries, elevators and storages are overflowing, export possibilities are limited, and new crops are on the way. The Governments of Argentina, Australia, Canada, and the United States agree to "adopt or maintain positive measures to control production" in order that the further accumulation of such stocks may be checked.

(2) The immediate establishment of a pool of wheat for intergovernmental relief purposes. This wheat is to be used in war-stricken and other necessitous areas as soon as the international situation permits. The initial contribution to this pool amounts to 100 million bushels, and additional contributions are provided for as they may be needed.

(3) To stabilize the wheat-export market in the immediate post-war period. Without joint action for this purpose, new low wheat prices, increased trade barriers, and general disorganization and confusion could be expected to result as soon as war activities ceased and export trade was again resumed. Measures for stabilizing the world wheat trade include export quotas and minimum export prices.

In view of the many problems involved in negotiating a comprehensive international wheat agreement at the present time, two documents were drafted at meetings held in Washington during the past year. There were two general series of meetings, the first, from July 10, 1941, to August 3, 1941; the second, from October 14, 1941, to April 22, 1942. The documents are called Memorandum of Agreement and Draft Convention.

The Memorandum of Agreement is, in effect, an interim agreement—one which is designed to carry out the objectives noted above during the war and early post-war period. It has a maximum period of duration of 2 years from the time the present war hostilities cease, and it may be superseded if a new agreement is negotiated in the meantime.

The Draft Convention represents the kind of comprehensive, longer time wheat agreement which the five participating countries believe is desirable and necessary to handle the world wheat problem. It will be submitted for consideration at a general wheat conference to be called as soon as the time has come when representatives from all countries with a substantial interest in wheat may attend. Meanwhile those sections of the Convention necessary to carry out the objectives indicated are operative, as provided for in the Memorandum of Agreement.

In accordance with the provisions of the Agreement, a Wheat Council representing the five countries has been established, and the first meeting was held in Washington on August 3–5, 1942. Officers for the Council have been selected and an executive committee set up to carry out the provisions of the agreement.

As the wheat agreement is the first international commodity agreement negotiated with respect to the war and post-war period, it may be expected to serve as a pattern for other commodity agreements. Above all, it reflects the method by which international problems may be handled and one of the ways the peace may be won.

WHEAT IN LIVESTOCK FEEDING

We have millions of bushels of wheat not now needed as food. But the need is urgent for meat and milk and eggs which can be produced from wheat used as feed. Wheat producers have been piling thousands of bushels of wheat on the ground this year because so much storage space was still filled with last year's crop. We have enough wheat now to last more than two years if used mostly for making flour, as in the past. When this year's harvest started we had nearly a year's supply on hand. The crop this year, the second largest in our history, supplied enough for nearly another year and a half.

Corn reserves, until this year's crop came along, had been going down. The annual use of corn is increasing by the millions of bushels.

In the last year we have used 150 million bushels more than we produced in the 1941 crop. During the next 12 months, with no more than normal feeding of wheat, we would use more than 200 million bushels more corn than we produced in the 1942 crop.

Thus far, reserves of grains stored up in the Ever-Normal Granary have enabled farmers to break all records for producing livestock products. But if we are to maintain the high level of production of livestock products needed for war it appears that we shall have to look more and more to wheat as a source of livestock feed.

Wheat for feed is already available and Congress provided for the sale this year of 125 million bushels of Government-owned wheat for feed at 85 percent of the parity price for corn. This made wheat a good buy for feed. If at some future time it should be necessary to plan for wheat production especially for feed it would be better from the standpoint of the total wartime production job of agriculture to produce it in the specialized wheat areas.

The national wheat acreage allotment for 1943 under the A. A. A. program is 55 million acres. This is the same as in 1942 and 1939, and is the minimum permitted under the law. Seedings in the last 3 years have been near the national allotment. Average yields (12 bushels per acre) on 55 million acres would give a crop of 660 million bushels. This would be somewhat below probable domestic utilization in 1943 and would allow some reduction in the prospective carry-over.

Livestock and Feed

Production and marketings of meat animals in 1942 will set new high records, and further increases are in prospect for 1943. The 1942 goal for total meat production of 21.7 billion pounds will be reached or slightly exceeded. Production in 1943 may reach the exceptionally large total of nearly 24 billion pounds, as compared with an average production in recent years of about 17.6 billion pounds. Despite these gains, total supplies of meats are not large in relation to the demand. Military and lend-lease requirements are heavy, and the wartime needs of civilians are also large.

Meat shortages have developed during the summer in some sections of the country, particularly in the Northeast. They have resulted from several factors, especially from great expansion in civilian consumer demand. National income in 1942 will be close to 113 billion dollars, as compared with 86 billion dollars in the predepression year 1929. Consumers have more to spend for meats than ever before. They would like to buy more meat than the quantity available at ceiling prices.

Military and lend-lease requirements are about offsetting the increases in meat production which have taken place during the past year or so. The per capita supply of meats available for civilians, although a little smaller than in 1940 and 1941, is as large as in other recent years. As mentioned, however, it lags behind the consumer demand. Shortages in the Northeast appear to have been due also, in part at least, to inequalities in the price ceilings on meats. In several cities along the eastern seaboard dealers' price ceilings were lower than in other areas. Packers tend to supply consumers with the highest price ceilings first; so these eastern seaboard cities were the first to suffer. The Office of Price Administration is taking steps to correct regional inequalities in the price ceilings.

Military and civilian demand for meat has kept livestock prices going up. There has been no ceiling on livestock prices, merely ceilings on the retail price of meats. The situation has caught many meat packers, particularly the smaller firms, in a squeeze. Packers able to do so, at some temporary sacrifice of profits, have been bidding up the price of livestock to fill their orders and keep their civilian customers. Other packers, unable to compete on this basis, have either closed or prepared to close their plants. Such a situation could be left in ordinary times to work itself out, but not in wartime. The Nation has need of all its packing-plant facilities; steps must be taken to keep all packing plants running, and at the same time to avoid violations of the price ceilings for meats.

Accordingly, on August 20 the Secretary announced he would approve ceilings on livestock prices if a practical plan for livestock marketing could be evolved which would not permit abnormal profits

to anyone in the industry at the expense of producers or consumers. It seemed the plan would have to include an allocation of supplies to facilitate a more equitable distribution, and measures which, while protecting packers from high prices, would assure farmers of protection from low prices. Ceilings on livestock cannot increase the supply of meat to consumers; but they can help to keep the packing industry in full operation and to safeguard the price-control structure.

On the recommendation of this Department, farmers began to step up their production of hogs early in 1941. Previously a marked downward trend in hog production had been under way. Assurances from the Department that hog prices would be supported at a favorable level through June 1943, along with expanding consumer demand and lend-lease purchases of pork and lard, caused farmers to increase their 1941 farrowings. Moreover the hog-corn price ratio was favorable for hog production.

THE LIVESTOCK GOALS FOR 1942

Farm goals for 1942, established in September 1941, included a total hog slaughter of about 79 million head—8 million more than in 1941. Farmers responded with a greater increase in their production plans than had been expected, and in its January revision of the goals the Department raised the 1942 hog-slaughter goal to 83 million head. Farmers raised the largest pig crop on record—105 million head, one-third more than the average number of pigs raised annually in the 10 years prior to the 1934 drought. The spring pig crop of 62 million head was about 25 percent greater than that of 1941; the fall crop, estimated at 43.5 million head, was about 22 percent greater. Production rose sharply in nearly all States.

Hog marketings during the 1942–43 fall and winter season (October–April) may exceed those of a year earlier by 9 or 10 million head. If they follow the usual seasonal pattern, and develop the usual peak in December and January, marketings for slaughter at federally inspected plants may exceed a monthly rate of 7.5 million head in one or both of these months. The previous record month's hog slaughter under Federal inspection was 6.6 million head in December 1924. Some marketing difficulties may develop this winter if hog marketings during the October–April period are distributed no more evenly than usual.

Farmers have not produced more hogs than the country needs. All the hogs, and more too, are in demand. But because of wartime conditions, with priorities on steel and shortages of skilled labor, packing plants and other parts of the meat industry have not been able to make the adjustments they would normally have made to handle the exceptionally large supply of hogs which will be marketed this fall and winter. The department has consequently urged farmers to fatten their early spring pigs as rapidly as possible and get as many of them as possible on the market before December. This advice, good in most years, is particularly applicable this year.

The Department has also emphasized the fact that one of the best ways of putting rapid gains on hogs is to include an adequate amount

of high-protein supplements in the hog ration. Soybean meal, the production of which has been stepped up sharply, is an excellent source of protein. Wheat in the ration can also supply part of the protein needed for rapid and economical gains.

Purchasing of hog products for lend-lease shipments was begun in March 1941. Since then (through August 22, 1942) purchases of pork by the Department have amounted to more than 1,500 million pounds, the equivalent of the pork from about 14 million hogs. Lend-lease purchases of lard have totaled about 820 million pounds, representing the lard from about 25 million hogs. For a time during the spring and early summer months these purchases accounted for about one-third of the pork and one-half of the lard produced under Federal inspection.

Lend-lease requirements of hog products in 1943 will be still greater. The pork needs of our Army and Navy in 1943 will also be much greater. These large requirements are expected to exceed the increased production under the Food for Freedom program. Nevertheless, supplies for civilian consumption should be as large as in most recent years and considerably greater than in the short-production years that followed the 1934 and 1936 droughts.

THE TREND IN CATTLE NUMBERS

Cattle numbers tend to fluctuate in cycles about 15 years in length. A low point in the cattle cycle was reached in 1938. Since then cattlemen have built their herds up sharply. Cattle and calves on farms and ranches January 1, 1942, totaled 74.6 million head—9.4 million head more than in 1938 and slightly more than the peak number reached in 1934. The Department in 1942 urged farmers to increase their marketings of cattle for slaughter and to increase production through improved management and feeding practices. This recommendation considered the need for increased beef supplies in 1942 and a sustained high production in 1943 and as long as the war lasts.

The goal for total cattle and calf slaughter was 28 million head, a figure expected to about equal the 1942 calf crop plus imports, after allowing for death losses. Large marketings of cattle and calves thus far in 1942 indicate that the goal may be reached, though a larger-than-expected calf crop will permit a further increase in the number of cattle and calves on farms. Favorable pasture and range conditions may encourage some further increases in the Great Plains area. Cattle numbers there are dangerously close to the excessive 1934 drought-year peak.

Our cattle population may increase too much in relation to our total feed resources; nevertheless the present high level of cattle numbers coincides with a great demand for meats. Prices of cattle generally are the highest since the last war, and farmers can profitably market increased numbers. Prices are exceptionally good for the lower grades. Under these conditions close culling of herds should be a desirable practice. The present situation offers cattlemen the opportunity to organize their breeding and feeding practices to produce most efficiently for maximum sustained beef and veal production.

SHEEP AND WOOL

Sheep numbers have increased steadily during the past several years. The number on farms and ranches on January 1 was nearly 56 million head—the largest total on record. Only a relatively small increase in marketings was recommended in the 1942 goals; thus some further increase in sheep numbers is occurring. In the Corn Belt and the Eastern States sharp increases have taken place in the production of other livestock and livestock products, and these tend to restrict the prospect of further increases in sheep. The 1942 lamb crop was slightly smaller than the record crop of last year. This is not serious from the point of view of our total meat supply. Lamb and mutton ordinarily constitute only about 5 percent of our total meat production.

Wool, on the other hand, is an extremely vital war commodity. Our production of wool should be increased as much as possible. In 1941 mill consumption of apparel wool in the United States was over a billion pounds, against domestic production of less than 500 million pounds. We imported the balance from countries in the Southern Hemisphere—chiefly Australia, South America, and South Africa. Wool requirements for our armed forces alone now are considerably greater than our total annual domestic production. It is not certain that imports will continue to be available in the quantity needed. The necessity for maintaining domestic wool production at as high a level as possible is therefore evident.

LIVESTOCK FEED REQUIREMENTS

Livestock feed requirements in 1942 are being met without serious difficulty from last year's large crop of corn and other feed grains, and from the large carry-over of corn from the 1940–41 feeding season. Crop prospects and stocks on hand indicate that the combined 1942–43 supply of four feed grains will total approximately 131 million tons—1 million tons more than the near-record supply of last year. Larger quantities of wheat available under the Government wheat-feeding program add further to the 1942–43 feed supply. But with livestock numbers (especially hogs) increasing rapidly, the supply of feed grains per animal unit probably will be smaller than that of last year by about 6 percent.

The 1942–43 corn supply is expected to be nearly as large as that of last season—about 3.3 billion bushels. Oat and barley supplies may be 9 percent and 16 percent larger, respectively. The 1942–43 supply of high-protein feeds may be about 8 million tons, nearly 40 percent larger than in 1941–42. Pasture conditions this summer have been much better than average in practically all parts of the country. The 1942 hay crop may be about 102 million tons; with the May 1 carry-over, this production would result in a total supply of 114 million tons, the largest since 1916.

Prices of most livestock have advanced sharply. Though the Office of Price Administration has established ceiling prices for several meat products, meat-animal prices in 1942 will average about one-third higher than last year and will be the highest since 1919. Since

marketings are of record size also this year, cash farm income from meat animals in 1942 may exceed the previous record income of about 4 billion dollars in 1919 and 1918 by as much as 10 percent. Part of this increase has been offset by rising costs, but 1942 in general has been a good year for livestock producers.

To make certain of sufficient meat for Army, Navy, and lend-lease uses, the Foods Requirements Committee in September set up a policy of limiting total packer deliveries of meat for civilian consumption and placed the limit for such deliveries during the final quarter of 1942 at the following percentages of total packer deliveries during the final quarter of 1941: Pork, 75 percent; beef, 80 percent; lamb and mutton, 95 percent; veal, 100 percent. To provide for fair sharing of this meat supply, the committee asked civilians voluntarily to hold their consumption at 2½ pounds per person per week. The limitation figures for the last 3 months of 1942 indicate an over-all reduction of 21 percent below the quantity of beef, veal, pork, lamb, and mutton available in the last quarter of 1941.

CONSUMER RATIONING OF MEATS

Formal consumer rationing of meats probably will be instituted early in 1943. During the coming year there will be available to civilians about 17½ billion pounds of dressed meat carcasses. Converting dressed carcasses to retail cuts involves a shrinkage of 10 percent. Hence, the supply of retail cuts will total 15¾ billion pounds for the 12-month period, or 303 million pounds a week. This is to be shared among 128 million Americans not in the armed services. Babies and vegetarians eat no meat, and children, invalids, and old people eat less than average adults and adolescents. Reckoning 14 million half rations of meat and 114 million full rations gives a total of 121 million full rations. The allowance for each adolescent and adult of normal meat-eating habits is arrived at by dividing the 121 million full rations into 303 million pounds. This gives 2½ pounds per person per week.

Our Dairy Industry

In peacetime this country normally consumes practically all its dairy products and a little more; it sells only a small amount in foreign countries and imports large quantities of certain types of cheese. The war has changed all this and required a considerable increase in our dairy production. American dairymen now have the job of producing enough for the armed forces, enough for the workers and the civilian population, and a large additional amount for our allies overseas.

On the basis of these enlarged needs, the Department asked dairymen to produce 125 billion pounds of milk in 1942—or 8 percent more than the record output in 1941. This goal provided roughly 40 billion pounds of milk for the urban population and the armed forces, for fluid use, cream, and ice cream; 25 billion pounds for use on the farms; and 60 billion pounds to go into the three manufactured products, butter, cheese, and evaporated milk.

The Department broke this over-all production goal down to a State basis and worked with State and County War Boards in a further breakdown to a county basis. In setting up the State goals, it considered existing facilities for making cheese, evaporated milk, and powdered milk, the dairy products most urgently wanted by the United Nations. It carefully considered also the needs of fluid-milk markets and of Army camps and defense industries. The general purpose was to coordinate the production goals with marketing facilities as efficiently as possible. State, county, and local goals were established so that every farmer would know his part in the program.

Along with the production goals the Department announced a price-supporting program. With respect to evaporated milk, cheese, and dry skim milk, which were especially needed, the Department promised to support the prices at 85 percent of parity; a pricing policy has been developed to stimulate the production needed to meet war needs. Subsequently, on March 28, 1942, the Department announced it would support the price of butter at 36 cents a pound, 92-score at Chicago, for the remainder of the year. In midsummer it put a floor under cheese prices at 20.25 cents a pound.

In July, the Department announced a further adjustment of the prices of the five manufactured dairy products, intended to maintain the current high rate of dairy production and facilitate shifts to the types of products most needed. The adjustments reduced prices for evaporated milk and roller-process dry skim milk and increased prices for spray-process dry skim milk, for butter, and for cheese.

THE LEND-LEASE CALL

Figures of British needs show the size of the lend-lease call on the American dairy industry. Great Britain originally requested 22

million cases of evaporated milk. This was equivalent to 40 percent of our domestic production in 1940. The British requirement for evaporated milk was later reduced to 7 million cases a year, and that for the more concentrated products, such as dry skim milk and dry whole milk increased. The British asked for 250 million pounds of cheese, a quantity likewise equal to 40 percent of our output in 1940. In dry skim milk the British called for an amount equal to more than 60 percent of our production in 1940. Such enormous new demands present difficult problems for dairymen and processors.

Although it was evident that the total milk-production goal for 1942 would not be reached by about 4 percent, the goal for the processed dairy products most urgently needed for our armed forces and allies was exceeded.

From March 1941 to July 1942 the Agricultural Marketing Administration bought about 40 million cases of evaporated milk for shipment under the lend-lease program, or about one-third of all the production. In the same period it purchased about 385 million pounds of cheese. This also amounted to about one-third of the total domestic output. Purchases of dry skim milk in the same months totaled 290 million pounds and represented about 30 percent of our production. About 6 million pounds of dry whole milk was bought during this period. AMA spent about $260,000,000 for dairy products under the lend-lease program.

This heavy buying for lend-lease export, along with an improvement in the domestic demand, gave dairy farmers increased returns. Cash farm income from the sale of dairy products in 1941 was $1,897,000,000—25 percent more than in 1940 and $58,000,000 above the previous peak in 1929. Sale of milk and milk products by dairymen increased 7 percent in volume in 1941 over 1940; the average price received rose by 17 percent.

MILK COWS INCREASING

The number of milk cows in the country has been increasing during the past 3 years. Prospects are for further increases during the next year or two, since the number of young stock on farms is relatively large. Not only were more cows milked, but the average production per cow in 1941 was also the highest on record. This was the result of good pastures in most sections of the country, plus liberal use of feeds under the stimulus of higher prices for milk products.

Nevertheless dairymen had to contend with some serious problems. Much of their hired labor shifted to the armed services and the war industries, and farm wages increased. Feed prices increased more than the prices of dairy products. Rising costs of production tended partially to offset the larger income received. Moreover, the dairy industry faced the necessity of making further changes to meet special wartime demands. Shortage of gasoline, of rubber tires, and of many metals threatened its transportation and distribution facilities.

Dairy Research

This year's increase in total milk production, and also in average production per cow, was the result in part of heavier feeding and in part of the fact that many dairy farmers and breeders had developed better herds and cows in the last few years by following scientific breeding practices. Many dairy farmers can keep smaller herds and produce the same total quantity of milk as before. Moreover, with fewer but better cows, they need less feed and less hired labor.

Much of the improved efficiency is traceable to the influence of the dairy herd-improvement association program. Sponsored jointly for more than 30 years by the Department and the State extension services, the program has the participation of some 30,000 dairy farmers and breeders of registered cattle. They keep yearly production records on 800,000 cows. The association herds serve to demonstrate good dairy practices. Production records in these association herds are chiefly valuable, however, as the basis of a Nation-wide program for breeding up the milk-production inheritance of all our dairy cattle.

Research in the Bureau of Dairy Industry showed the proved-sire system of breeding to be a sure and quick way to "purify" the inheritance of a herd for a high level of production. In 1935 the Bureau and State extension dairymen started a sire-proving, or sampling, program to find the outstanding sires in the association herds—the sires with a high percentage of their daughters in a higher production class than the cows to which the sires had been mated.

Using good proved sires, the association members gradually improve the genetic make-up of their herds. Many of them provide improved breeding stock, particularly young bulls, for use in ordinary farm herds. The average association cow last year produced 8,133 pounds of milk, whereas the average for all cows milked in the United States was only 4,742 pounds. As the influence of the association herds increases, average milk production per cow may be expected to rise. Experimental breeding herds maintained by the Bureau at Beltsville and at 7 regional field stations contribute superior germ plasm to farm herds. No other herds in the United States have been maintained for so many generations of proved-sire matings; few, if any, other herds are the equal of these experimental herds in the purity of their inheritance for high levels of production. Young bulls from these herds are placed in good farm herds to obtain information on their breeding ability as a part of the research program. On the average they have increased milk production in these herds by 1,000 pounds per cow.

At present 267 young bulls from the Department's experimental herds are serving their "apprenticeship" in farm herds; 10 of them are in artificial-breeding circuits, where their influence is being spread manyfold. Many of these bulls have daughters coming into milk this

year, more of them will have daughters in milk next year, and those going into farm herds this year will have milking daughters within the next 3 years. Owners of the better bred association herds are following a similar breeding and loan program; so the influence of the proved-sire program should be very pronounced in the next few years.

CONSERVING MILK FOR WAR USES

Research in the Bureau is helping to conserve our milk supply for wartime uses. Milk is about 87 percent water; it is also very perishable. Milk for shipment to distant places must be concentrated and packaged so that it can be transported economically and will remain edible for a long time. This usually requires machinery and containers made of metals or other critical materials. It sets a problem not only in the manufacturing of various milk products, but also in the production of substitute containers, or substitute parts for containers and processing machinery. Fundamental research has been and continues to be important in solving these problems.

Packaging of condensed milk in tin cans was an early method of conserving milk. Half the water was removed from the milk, and sugar was added to preserve it. Milk in this form came into use by soldiers during the Civil War, and immediately afterward by scouts and settlers in the West. But in the present war both tinned cans and sugar are critical war materials.

Evaporated milk is also sealed in tinned cans, but it is sterilized with heat to preserve it. Introduced in the early eighties, it found its greatest favor during the First World War, when we exported great quantities for the allied armies. Nearly half our production went abroad in 1919, largely to feed starving children and refugees. Evaporated milk, like condensed milk, is only about half the volume of the original milk. It came into heavy demand in the present war when we began our lend-lease shipments to Great Britain though shipping space was scarce even then.

The Bureau of Dairy Industry had been working for some time on various problems concerned with the manufacture of evaporated milk. It sought particularly to eliminate the use of stabilizing salts that usually had to be added in order to sterilize without curdling the concentrated milk. Scientists discovered that preheating the milk well above the boiling point for a few minutes made chemical salts unnecessary and permitted an increased concentration of the product—from the usual 26 percent to about 33 percent. This procedure offered a promising means of conserving both shipping space and tin cans. Although the industry has not yet adopted the procedure, the economy of it and also the improved flavor and color it gives to the product are obvious advantages.

Conservation of shipping space soon became so urgent that the Department turned its attention to dried milks—first to dried skim milk and later to dried whole milk. These products contain practically no water and occupy only about 9 and 12½ percent as much space, respectively, as their fluid forms. Manufacturers have produced dried or powdered skim milk for a number of years, and have exported considerable quantities. So far in the present war we have

shipped several hundred million pounds to the United Nations. The shipments have not involved any special research problems.

The principal difficulty was to get more skim-milk powder made by the spray process. Most drying plants have the less expensive roller equipment; formerly they made skim-milk powder largely for use in livestock feeds. Greater care in procuring high-quality skim milk and more attention to sanitation enabled them to turn out a product entirely suitable for human food, particularly in baking and cooking. But skim-milk powder made by the spray process is more easily dissolved in water, and lend-lease demands were increasing for powder to be consumed in fluid form. The installation of spray-process equipment in additional plants was necessary, and also differentials in lend-lease purchase prices to encourage greater production of the spray-process powder.

NEW TECHNIQUES IN MILK PROCESSING

Whole-milk powder is now in demand for shipment abroad in place of evaporated milk. Though produced commercially for many years, whole-milk powder has been limited in its uses because the fat usually deteriorates rapidly and gives the product a stale or rancid taste. The Bureau of Dairy Industry demonstrated a few years ago, however, that the fat in fresh milk is remarkably resistant to oxidation, or spoilage. Cream pasteurized within a few hours after it comes from the cow will retain its fresh flavor for a year or more in freezing storage; the same cream held for longer periods before it is pasteurized loses its exceptional keeping quality. Apprised of this finding, many manufacturers of whole-milk powder get the milk from the cow to the drying plant as soon as possible. Some of them require twice-a-day delivery of milk. In general these are the manufacturers who are making powdered milk of superior keeping quality. Production of whole-milk powder that is uniformly good in quality is not yet established widely, but it should increase.

Butter oil, the pure fat of milk, makes up 80 percent of the composition of butter. It meets wartime requirements for a highly concentrated food which can be transported without refrigeration and held for long periods. Butter oil is made by melting fresh churned butter in the granule stage. The melted fat is floated off the water and the serum, centrifuged to remove additional water and curd, and vacuum dried to remove the final traces of water and also oxygen and other gases. As butter oil it retains all the nutritive properties of the fat in the original butter; in other words, practically all the food value. It can be used instead of butter, either in liquid form for cooking or as a spread, or in combination with a little skim-milk powder, water, and salt. In the latter form, when hardened with cold water, it makes a butter of the usual composition and body. Properly prepared and packaged, butter oil provides butter for use where temperatures are high and refrigeration facilities limited. Metal drums would be ideal for large-scale shipments, but these containers require restricted materials; so the use of wooden kegs is being considered.

Another concentrated dairy food in demand for lend-lease shipment is American Cheddar cheese. Government purchases must be limited to the No. 1 grade, because lower grades may break down and develop off flavors under severe conditions of transportation and storage. While the Department has had no difficulty in obtaining good-quality cheese in sufficient quantities, the increased demand has created a domestic surplus of low-grade cheese. For this there is no ready market. Many cheesemakers normally make a large percentage of cheese below the No. 1 grade. Total cheese production practically doubled in response to the Food for Freedom program, and the production of lower grades increased proportionately, with no like increase in the domestic demand. Methods are available, however, which will reduce the percentage of the lower grades.

Research in the Bureau of Dairy Industry, and demonstrations in commercial cheese factories, have shown that almost any cheesemaker can materially improve the average quality of his output merely by grading all the milk for quality. Pasterizing the milk is advisable, since the making process can be better controlled with pasteurized milk than with raw milk. The cheese industry could profit by giving more attention to quality, because good cheese will improve with age and will command higher prices the longer it is held. Lower grades, on the other hand, will not improve with age; they may even become a complete loss unless held at costly low refrigeration temperatures.

Efforts of the Bureau to devise lacquer substitutes for tin containers, through the use of lactic acid obtained from the whey that is a byproduct in cheese and casein factories, are making progress. In experimental coating of steel milk cans this lacquer has proved highly successful, and also for coating evaporated milk cans. The dairy scientists had previously developed lacquers suitable for coating wood, paper, glass, and other substances. Some of these lactic-acid lacquers doubtless would be useful to various branches of the canned-food industry.

Poultry and Eggs

The relative well-being of nations, from the food standpoint, can be gauged to a considerable extent by their output of poultry products. Poultry numbers per capita in European countries were much smaller even in peacetime than in the United States. After the outbreak of the war, poultry was the first kind of livestock in Europe to be greatly reduced in volume. Most European countries appear to have reduced their poultry numbers to considerably less than half of the pre-war levels. They have also reduced their hog numbers drastically. They have had no other alternative.

The concentrated feed used in producing poultry and hogs may be used to better immediate advantage as food for humans. Poultry and hogs, moreover, can be increased more rapidly than other livestock when feed once more becomes available.

In the United States, on the other hand, supplies of feed permitted a material increase in all livestock numbers. In poultry the increase was very large. The number of chickens raised on farms in 1941 was 16 percent larger than in 1940. By January 1942 the number of layers on farms was 12 percent larger than a year earlier. In the first half of 1942 the egg-feed price ratio was unusually favorable. Consequently, numbers of layers declined less than usual from the January peak to the August low point. In fact, the number in August was 14 percent larger than a year earlier. Production per layer in 1941 was 110 eggs, by far the largest on record. The rate of lay in 1942 averaged slightly higher than in the previous year. Total production of eggs on farms in the United States in 1942 was considerably larger than in 1941, and domestic consumption was about as large as in the previous year despite large exports under the lend-lease program.

Heavy purchases of eggs by the Department of Agriculture for lend-lease shipment supplemented the strong domestic consumer demand. This price support was mainly in purchases of dried eggs. Plans were under way early in 1942 for the shipment of shell and frozen eggs as well as dried eggs. Shipping conditions, however, made it desirable to convert almost all eggs for lend-lease export into the dried form. Egg-drying facilities were expanded, and by mid-year the monthly output was meeting lend-lease requirements. By mid-1942 about 22 million pounds of dried eggs were being produced monthly—more than twice the pre-war record annual output of 1939.

Shipping eggs in the dried form saves considerable ship space. The drying of eggs in June, for example, removed about 30,000 tons of water from 2.2 million cases. This quantity of water would cover 265 acres of land 1 inch deep. Moreover, the dried product packs smaller than shell eggs and does not need refrigeration.

At first processors packed dried eggs in 150- to 200-pound drums. But these containers were not well suited for distribution among family units. Small cardboard containers are in increasing use now for family distribution. Five ounces of the egg powder is equivalent to 1 dozen eggs, and this product suits our allies in the war emergency and offers great potentialities in this country for the post-war period.

As part of a program to support egg prices at not less than 85 percent of parity, the Department also purchased shell eggs in producing areas and on the mercantile exchanges. In the Southern States, where production increased materially and overtaxed marketing facilities, it purchased eggs in lots as small as 10 cases through local representatives. It announced also that offers for the sale of shell eggs in carload lots from anywhere in the United States would be received. Egg prices, however, held well above the support level; so the Department did not have to do much egg buying in this manner or on the exchanges. The Department made wheat available from the Ever-Normal Granary for use as poultry feed. This action was especially helpful in the Pacific Northwest and in the Northeast, and it influenced feed prices to some extent in all areas. Several million bushels of wheat were converted into eggs.

REGIONAL CONDITIONS AND PRICE RELATIONSHIPS

Egg production increased proportionately most in the West, North, and South Central States. This was due largely to the abundance of the feed supplies in that area and to the favorable prices that the outlet for dried eggs created. In the West, North, and South Central States the egg-feed price ratio was relatively more favorable than in the United States as a whole. Nevertheless, the Midwest shipped fewer eggs to eastern markets than in 1941. The Eastern States dried few eggs; the increased output there had to be marketed as fresh eggs in consuming centers. The result was a relatively large supply of high-quality eggs in eastern markets, with relatively low prices for such eggs as compared with eggs of average grade. Farmers, however, received prices above the support level and materially above 1941 prices.

Favorable egg-feed price relationships during the 1941–42 season led to a record demand for baby chicks. Output of chicks by commercial hatcheries in the main hatching months of 1942 was considerably larger than in the corresponding period of 1941. Eleven percent more chicks were raised on farms. This increase assured a record production of chicken meat and a further increase in layers for 1943. Consumer demand, however, was stronger for all meats; so the increased supplies of chicken did not depress prices. In fact, chicken prices to farmers averaged considerably higher than in 1941. Though not used as extensively as some other meats in the lend-lease program, chicken to some extent replaced meats that were exported. As compared, however, with the prices of important cuts of other meats, chicken prices for the year were relatively low.

In September the Department asked the Nation's poultry industry to produce 200,000,000 extra chickens during the fall and winter

months, and rear them to an average weight of 3 pounds, to help supplement the supplies of meat in prospect for civilian use. Proposed by the National Poultry Defense Committee and affiliated organizations, this means of increasing the meat supply for civilians will constitute an addition to record production of eggs, laying hens, and meat chickens for all wartime requirements in 1942. Poultrymen and farmers who participate in the program will utilize brooder houses and other production equipment not normally used to capacity during this period of the year. A 5-point plan has been suggested: (1) Increased hatchery outputs at this season in line with demand for chicks; (2) adoption of a management program to meet cold weather production problems; (3) feeding to utilize feed wheat and vegetable oil meals of which there are greatly increased supplies; (4) sanitation; and (5) utilization of existing equipment and facilities. Raising 200,000,000 extra chickens will require more than a million tons of feed if they are marketed at an average weight of about 3 pounds. Fortunately ample quantities of feed wheat together with soybean and peanut meal will be available to supplement normal poultry feed supplies.

Fruits and Vegetables

Growers of fruits and vegetables continued to benefit from an expanding demand during 1942. In general, production increased substantially, largely as a result of a favorable growing season. Moreover, prices received by producers advanced generally to levels well above those of recent years.

Cash farm income from fruits totaled at least one-third higher than in 1941. Partially offsetting the resulting higher returns were increasing costs for equipment and materials, higher labor costs, and losses due to the inability of growers to get sufficient equipment and labor. As a result of the labor situation, some shifts were made in the kind of vegetables grown, with some decrease in those requiring considerable hand labor. Transportation of fresh fruits and vegetables to market became a serious problem. The restrictions on tin plate limited the packs of some canned fruits and vegetables and reduced the output considerably in some instances. In general, however, the rapidly expanding market demand for fresh produce and increased demand for dried fruits and vegetables provided some relief. Government purchases for relief distribution were continued on a limited scale in areas where growers encountered exceptional marketing difficulties.

Fruit production was well above average and slightly above the large production of the 1940–41 season. A slight decrease in the production of deciduous fruits was more than offset by record crops of oranges and grapefruit and a large supply of lemons. Supplies of tree nuts in 1941–42 were well above the average of recent years though slightly smaller than in the previous year, largely because of a light pecan crop.

Nevertheless, the supply of fruit available for domestic civilian consumption during the 1942–43 marketing season will be less than in the previous season. This is because larger quantities of fresh and processed fruits are being required by the Government for the armed forces and for lend-lease shipment.

Government programs have greatly affected disposition of the fruit crop this season. A major influence was the tin allocation order by the War Production Board, which controlled canning operations for the double purpose of conserving tin plate and encouraging the canning of the most needed products.

To obtain sufficient production of the six major dried fruits for military and lend-lease needs, the Department announced support prices for dried apples, peaches, pears, apricots, prunes, and raisins. This program resulted in a larger-than-normal proportion of these fruits being dried. The War Production Board issued an order in August that required packers of dried fruits to hold their supplies for at least 60 days after the opening of the new season, so that the Government would have ample time to make its purchases. After the

various Government requirements are satisfied, the civilian trade may enter the market. WPB also ordered that all raisin-variety grapes be made into raisins except where this would be impractical.

The Office of Price Administration in June issued an order which froze wholesale and retail prices of canned and dried fruits at the highest levels prevailing in March 1942. Costs had risen to such an extent, however, that processors could not operate this season under the March ceilings. Accordingly OPA amended the order so that the ceilings could be advanced at least 15 percent. The situation illustrated a major difficulty in price control. It is necessary to maintain prices received by producers for many food products at a level high enough to insure an adequate supply. Sometimes the required level necessitates an advance in the wholesale and retail price if the product is to be distributed.

VEGETABLE CROPS AND PROGRAMS

Production of nearly all the important vegetable crops in 1942 is well above that of 1941. The acreage for harvest is only slightly higher; bumper yields are mainly responsible for the larger output. Growing conditions were very favorable for most types of vegetables. The potato crop, according to the September crop report, will be increased 6 percent over that of 1941, the sweetpotato crop 10 percent, dry edible beans production 15 percent, and truck crops for market about 7 percent. Output of truck crops for processing will be increased sharply, as a result of both large plantings and excellent yields. These increases in many cases were due to price-support programs.

In the fall of 1941 an analysis indicated that the probable 1942 supplies of canned tomatoes and peas would be less than the total civilian, military, and lend-lease requirements. To increase production, the Department announced an expansion program with price support to canners at stated levels. This support applied only to canners certified by State USDA War Boards as having agreed to contract with growers for their 1942 requirements at prices equal to or above the minimum fair prices established by the War Boards. The stimulus provided by this program resulted in greatly increased plantings by growers.

Supplementing the canned pea and tomato program, the Department later announced a price-support program for 10 other canned vegetables to assure producers of an outlet. Additional canned vegetables included were asparagus, lima beans, snap beans, beets, sweet corn, carrots, spinach, pumpkin, squash, and tomato juice. Under this program, the Department agreed to purchase the 1942 packs of these 12 canned vegetables at 92 percent of the canner's individual maximum prices as determined by the Office of Price Administration, subject to certain limitations on the basis of area average maximum prices.

There was evidence early in 1942 that without price support the potato acreage would decline appreciably. Potato growers had gone through several disastrous seasons and were about to shift to other more profitable crops. A price-support program prevented a decline

in the potato acreage by insuring growers against price declines occasioned by high yields. The slightly increased acreage, along with record high yields, gave a crop of 378 million bushels, an ample supply for all requirements. Sweetpotato production is up over that of 1941, largely because of higher yields. In some areas the acreage is larger, too. Prices for potatoes and sweetpotatoes are averaging somewhat above those of the previous season.

Encouraged by a more favorable price-support program than that of 1941, growers increased the acreage of dry edible beans by 6 percent in 1942. The larger acreage, with a favorable growing season, resulted in a new high-record bean crop of 21.6 million bags. Together with large carry-over stocks, it assures supplies which will probably be ample for the 1942–43 marketing season, despite extra-large requirements for the armed forces, for lend-lease shipments, for exports to neighboring countries, and for domestic civilian consumption. Government purchases at the price-support level or higher assure dry bean producers in many areas of good returns.

In October the Department announced goals for 1943 production of winter vegetables. Within a total acreage the same as that of 1942, the goals requested increased acreages of some vegetables and decreased acreages of others, in line with their relative wartime importance. The Department asked farmers to increase their acreages of carrots, lima beans, snap beans, and onions from 15 to 30 percent. It asked the same acreages as in 1942 for green peas, cabbage, fresh tomatoes, beets, broccoli, and spinach, and decreased acreages of cantaloupes, cucumbers, cauliflower, eggplant, watermelons, bleached celery, head lettuce, green peppers, asparagus, and artichokes.

The Department warned farmers it could not assist with the production or marketing of the less-essential winter vegetables. Maximum suggested acreages of these, approved by the Food Requirements Committee, went to the State USDA War Boards for a break-down by counties in terms of maximum percentages of last year's acreages. Generally the maximum suggested acreages for the less-essential vegetables ranged from 70 to 85 percent of the 1942 levels. But the Department said it would not undertake to furnish labor for raising them, and would not pay the transportation of either domestic or Mexican workers employed for that purpose. It announced further that it would promote the use of all labor available locally for the production of the more-essential at the expense of the less-essential crops.

Sugar Production and Rationing

Sugar control had to be improvised for the protection of producers and consumers when this country entered World War I in 1917; but when World War II began the control of the sugar industry had already been in effect 6 years. It permitted rapid wartime action with the double objective of preventing runaway sugar prices and maintaining income for most domestic sugar producers at income-parity levels or better. It checked inflation in sugar prices, and consequently provided safeguards against the risk of severe inventory losses to processors and large-scale industrial users of sugar in the post-war period.

In line with with its policy of stimulating Food for Freedom production, the Department in the fall of 1941 made a survey to learn what should be done to encourage domestic sugar production. The survey showed that the continuance beyond December 31, 1941, of the protection growers had enjoyed since 1934 through the sugar-quota system was one of the steps necessary; also, that larger payments to producers under this legislation would be a second requirement.

Accordingly, when the Congress toward the end of 1941 was considering legislation to extend the life of the Sugar Act of 1937 for another 3 years, the Department approved the measure in general. Specifically, the Department supported a 33⅓ percent increase in the basic rate of conditional payments to domestic sugar producers during the present emergency. However, it called attention to certain features of the sugar bill which were in conflict with our policy of hemisphere cooperation, and pointed out that the proposed legislation would also alter the basic division of our sugar market among the various domestic areas in a manner detrimental to Hawaii and Puerto Rico.

These features were stricken from the bill by the Congress. As finally approved, the legislation (Public Law 386, 77th Cong., 1st sess., approved December 26, 1941) added the Virgin Islands to the domestic areas which are eligible for sugar payments. In accordance with emergency provisions of the Sugar Act and on the recommendation of this Department, the President suspended the sugar-quota system under a proclamation issued April 13, 1942. The purpose was to make it possible to import sugar into the United States from areas not included, or inadequately included, in the sugar-quota provisions of the sugar legislation.

Early in 1942 it became apparent that sugar rationing would be advisable. In fact steps toward rationing had been taken on December 7, 1941, immediately after word came of the attack at Pearl Harbor. On that date the Government requested primary distributors to restrict all deliveries of refined sugar to the immediate needs of industrial and commercial consumers. Later in the month the

Office of Production Management limited excess inventories in the hands of wholesalers, jobbers, and industrial users. Abnormally large purchases by consumers in 1941 had showed that under wartime conditions we could not continue to meet demands stimulated by widespread increases in consumer buying power.

It was evident early in 1942 that the action taken immediately after Pearl Harbor would have to be broadened. Among the indications was the uncertain ocean-shipping situation. As a means of supplying the unprecedentedly high demand, it had been necessary in 1941 to bring 1 million tons more sugar into this country from offshore domestic and foreign areas than in the preceding year. This extra importation had put a strain on ship space needed more urgently even then for other materials. Our involvement in the war obliged us to be still more economical with ship space and ship movements. It seemed, moreover, that the problem of getting labor and transportation would affect the sugar-producing areas of the mainland. Consequently, in the spring of 1942 the Office of Price Administration was authorized to ration sugar to individual consumers.

Since the Sugar Act did not authorize the Secretary of Agriculture to consider sea and land transportation difficulties, as well as the needs of consumers, in determining the quantity of sugar which should be made available to consumers during any calendar year under the quota provisions of the Sugar Act, the broad Federal war powers of other agencies over all industry had to be utilized in dealing with the wartime sugar problem.

This Department cooperated in the solution of shipping, allotment, and other difficulties. Through the Bureau of the Budget it reached an understanding with WPB, OPA, and other agencies on methods and procedures in assembling necessary current information. The arrangement entrusted this duty to the Department, which had long been accumulating comprehensive data on production, processings, imports and exports, incomes, and wages in the various branches of the sugar industry. The Department joined the State Department and the Office of Production Management in recommending to the Reconstruction Finance Corporation the purchase of virtually the entire 1942 Cuban sugar crop.

One purpose of this purchase operation was to prevent speculators from bidding up the price to the detriment of consumers in the United States and in the United Nations. Another was to promote economic stabilization in the neighbor Republic, which depends greatly on sugar. After difficult negotiations, the Defense Supplies Corporation concluded an agreement with the Cuban Government for the purchase of nearly all the 1942 Cuban sugar crop at $2.65 a hundred pounds, raw value, f. o. b., Cuba. The United States bought the Cuban sugar crops similarly in 1917 and 1918 during World War I. The British bought the bulk of the 1942 Dominican and Haitian crops. Lend-lease arrangements subsequently financed both these purchases.

Tobacco

Tobacco growers made further adjustments to meet war conditions. Most of the programs that provide for such adjustments were started in 1939, when the outbreak of war caused a sharp reduction in our tobacco exports. Previously these exports, which went largely to Great Britain and continental Europe, took approximately 40 percent of our tobacco production. About 750,000 farm families in the United States raise tobacco, and nearly 60 percent of them produce the export types. They plant an average of about 2 acres per family. In large measure the programs are responses to conditions created by war.

Programs for tobacco include: Marketing quotas and acreage allotments to adjust supplies; tobacco loan and purchase operations to stabilize prices at fair levels and to provide tobacco for lend-lease shipment; diversion of tobacco to the production of nicotine sulfate, which can partly replace formerly imported insecticides that are now unobtainable; tobacco inspection and grading to facilitate marketing through the standardization of grades; and aid to farmers in getting materials necessary for producing, marketing, and storing tobacco.

Action taken with regard to tobacco goals, and with regard to the production of insecticides, is typical of the response to war conditions. Tobacco goals announced in September 1941 provided for slightly smaller production of all major types in 1942 except the flue-cured types. Subsequently the Department reappraised the situation in the light of domestic consumption, lend-lease requirements, and 1941 production. This reappraisal led to provisions for maintaining 1942 production at the 1941 levels for all kinds of tobacco except flue-cured and Maryland.

Flue-cured allotments for 1942 were stepped up 10 percent, partly because of the larger lend-lease requirements. For Maryland tobacco a 10-percent increase of production was recommended. The revised goals represented acreage allotments large enough to fill all needs for domestic consumption and lend-lease export and to provide ample reserves. The allotments, along with marketing quotas, serve to keep plantings and marketings in line with the goals and to prevent excessive production of tobacco, with consequent waste of land, labor, and equipment needed to produce other crops.

It became apparent in 1942 that supplies of imported insecticides would no longer be sufficient. Accordingly, the Department encouraged increased manufacture of nicotine sulfate, which in many instances can be used as a substitute. Fire-cured and dark air-cured tobacco are the types most suitable for this purpose. Besides urging manufacturers of nicotine sulfate to purchase larger quantities of tobacco, the Department made additional quantities available through a Government subsidy. This action materially increased the supply of insecticides and aided the production of necessary food crops.

TOBACCO EARNINGS, LOANS, AND QUOTAS

Our 1941 crop of tobacco returned a gross income to the growers of about $332,000,000. This was a larger value than that of any previous tobacco crop except those of 1918 and 1919. Prices for most types were at about parity, the result primarily of a fair balance between supplies and demand. Tobacco consumption in the United States was at a record level. Total leaf tobacco used exceeded 1,150 million pounds (farm-sales weight), about 93 percent of it domestically grown. The use of cigarettes attained a new record during the year. Tax-paid withdrawals were about 15 percent larger than in 1941. Cigar consumption was at the highest level since 1929–30, and the downward trend in chewing tobacco was reversed. Snuff consumption was larger than for many years. Smoking mixtures were the only class of tobacco in which consumption decreased.

The purchase and loan program for tobacco has been broadened, in accordance with Congressional mandate, to cover all kinds of tobacco. It includes Puerto Rican tobacco, the marketing of which was affected by lack of shipping. The 1941 program was similar to that of previous years, but the crop was smaller and the takings by domestic manufacturers larger than in the preceding year; hence, the program financed only 145 million pounds in 1941 compared with more than 275 million pounds in 1940. A similar program is in operation for 1942. It has slight modifications from that of 1941 to facilitate lend-lease buying of tobacco and to assure sufficient quantities of the kinds of tobacco from which insecticides can be manufactured most efficiently.

Flue-cured and burley growers, by referenda, approved free and mandatory inspection on auction tobacco markets for these types of tobacco, which previously had not been designated for this service. As a result, Government inspection for the 1942–43 marketing season is authorized for all auction markets except those that handle Maryland tobacco. Markets for which grading is authorized handle more than four-fifths of the tobacco produced in the United States. Grading service will be provided on all such markets to the extent possible with the supply of qualified inspectors. Official grades were established in 1941 for some of the cigar types of tobacco.

Shortages exist of some materials necessary to the production and handling of tobacco. Producers and merchants have sought the help of the Department in coping with the problem. In response the Department has cooperated with producers and merchants in presenting the facts to the War Production Board and the board has taken action to make minimum requirements of these materials available for 1942. USDA War Boards were active in obtaining information and performing other work in connection with these and other farm problems.

Rice

The war has changed the position of rice more than that of other basic crops. It has raised the price from well below to far above parity, greatly increased the demand, and caused the AAA to shift the emphasis of its rice-program payments in an effort to balance production with war needs. In the 1941 program, rice growers who planted more than their rice-acreage allotments incurred deductions from their conservation payments. This year farmers who planted less than their allotments incurred deductions, except in cases where underplanting of allotments was due solely to the lack of water. Ten percent comes off their maximum rice payment for each 1 percent of their underplanting.

This change is the result of the war in the Pacific, which bars Asiatic rice from its usual markets, and of our own increased military and civilian demand. Rice is good food; it is concentrated and will keep. So the Government wants growers to produce more than ever before. In January 1942 it asked the rice growers to increase their 1942 seedings 5 percent over the 1941 seedings or 10 percent over the goal and national allotments which had been announced 3 months earlier. Growers responded fully. Indeed they went beyond the Government's request. The 1942 rice acreage will be the largest on record—nearly 1,500,000 acres, as compared with 1,257,000 acres seeded in 1941.

The demand for United States rice will probably continue strong as long as the war continues. Prices began rising early in 1941; they skyrocketed after the events at Pearl Harbor and the cessation of trade with the Orient. In June 1942 they averaged 138 percent of parity, with an increased spread between California and southern rice, which reflected the more favorable export position of the latter. Rice prices, as of October 15, averaged only 84 percent of parity in 1941, only 61 percent in 1940, and only 39 percent in 1932. During the depression years the export demand for our rice dropped off, and substantial surpluses accumulated.

Temporarily the United States and, to a lesser extent, Brazil, are the principal sources available to countries that normally take large quantities of Asiatic rice. Cuba in recent years has become our principal export market. We are shipping substantial quantities to Puerto Rico and Hawaii. There is the lend-lease movement as well, along with increased demand in the United States. Cash farm income from rice in 1941 was nearly 53 million dollars, as compared with a 1930–39 average of less than 29 million dollars. In 1942, if the crop is good and the demand holds, the return to growers may be close to 100 million dollars.

Production of rice in the United States this year may set a new high record. The crop of 1941 was 54,028,000 bushels, though it suffered

heavily from storms at harvest time. This total was only slightly smaller than the all-time record of 54,433,000 bushels the year before. Usually rice yields do not vary greatly from year to year, because the crop is an irrigated one. Average yields, however, have been rising in recent years. Yields per seeded acre in the 5-year period 1937–41 averaged 48.3 bushels, as compared with 37.7 in the 1906–25 period.

Good harvest weather in 1942 may give a crop of approximately 75 million bushels, which will find a ready market. Carry-over at the end of the 1941–42 season was low, and indications are that it will be only moderate at the end of the 1942–43 season. This forecast assumes that the war will still be on. What will happen when the fighting stops is another story since Asiatic rice costs less to produce than does our rice.

RICE ADJUSTMENT PROGRAM

Essentials of the rice-adjustment program remain in force despite the change in the production goal. Rice became a basic commodity under the Agricultural Adjustment Act of 1933. It was in trouble then as a result of difficult export conditions. Boosted in World War I, the acreage remained far above the domestic requirement; our export markets varied with the competition from Asiatic producers. Prices for both southern and California rice dropped sharply from 1925 to 1932. In 1933, however, a sharp recovery took place, the result chiefly of marketing agreements sponsored by the Government under the Agricultural Adjustment Act. Modified subsequently to include acreage allotments, the program facilitated prompt shifts to meet changing needs.

In 1935, because the marketing-agreement system had not been wholly satisfactory, the Department offered a rice program based on processing taxes and benefit payments. But this was short-lived. In January 1936, the United States Supreme Court held the processing taxes to be invalid levies through decisions in the *United States* v. *Butler and rice millers'* cases. Thereafter the program rested on soil-building and crop payments. Acreage allotments for rice came into force in 1938 and are basic in the current program, though the wartime penalty is for dropping below rather than going above them.

Associated with the allotment plan is a commodity-loan program, which was available previously but was put into operation for the first time in 1941. It makes loans available to producers at a rate based on 85 percent of parity. Generally, only farmers who plant 90 percent or more of their allotted acreage in 1942 can borrow under it. Farmers whose underplanting is due solely to the lack of water do not lose loan privileges. There is no current borrowing under the rice-loan program because the loan rate is below the market price. Nevertheless the loan plan remains in reserve, ready for use immediately should prices fall. It may not be necessary while the war continues, but it will be a safeguard to growers when they have to compete again with Asiatic rice in export markets.

In May the Office of Price Administration fixed the price of milled rice at levels high enough to maintain rough-rice prices at the highest

of the four alternative levels below which ceilings must not restrict prices of farm products under the provisions of the Emergency Price Control Act of 1942. Although recent prices have not reached the 1919 level, they have been above the high level of 1925, in which year they were the highest since 1919. It is well to bear in mind, however, that they are the result of war conditions. Our rice production, though only a small part of the world's total, is more than we need ourselves, and the end of the war will undoubtedly see a recurrence of difficult export problems for the highly specialized rice industry. We must maintain the adjustment program, adapted now to war conditions, so that it will be ready for the peace.

Fats and Oils Shortage

Early in 1942, following the Japanese attack on Pearl Harbor, it was evident that the United States faced a possible deficiency in its supplies of fats and oils. About 50 percent of our fats imports was cut off as a result of Japanese occupation of far eastern areas. Moreover, the requirements of our allies for fats and oils to be exported under lend-lease were mounting. Accordingly, the production goals for oil crops established in the fall of 1941 were revised sharply upward. The national peanut goal was set at 5 million harvested acres, or about 2½ times the harvested acreage in 1941. For soybeans the goal for 1942 was set at 9 million harvested acres, 54 percent above the acreage harvested for beans in 1941. The revised national goal for flaxseed called for 4.5 million seeded acres, a 34-percent increase over the 1941 acreage.

According to late-summer indications, approximately 4.2 million acres of peanuts will be picked and threshed this year, more than 10 million acres of soybeans will be harvested for beans, while 4.7 million acres were planted in flaxseed. Thus, while the peanut goal probably will not be attained, the soybean goal will be exceeded, and that for flaxseed just about attained; and with a 13-billion-bale cotton crop the production of cottonseed would be considerably larger than in the previous year. Farmers have planted over 7,500 acres of castor-beans for seed to be used in planting a large commercial acreage in 1943 if necessary. Meat production, expected to be the largest on record in 1942–43, will give an increased supply of lard, tallow, and greases. Full use of all the production aids available, however, may still not avert the necessity for limiting domestic consumption of fats and oils in some way.

Normally this country imports from 10 to 20 percent of its annual supply of fats, chiefly from tropical and semitropical lands. Coconut oil and copra, palm oil, palm kernels, babassu nuts, castor beans, tung oil, perilla oil, fish-liver oils, olive oil, and rape oil are among the important items. With imports from the Pacific cut off, the imports from other areas may increase moderately, especially from South America. However, ocean-shipping space is a bottle neck, and imports from South America may fall short of available supplies. In fact, the war and the shortage of vessels have reduced the prospect for our imports of fats and oils to less than half the pre-war level. Along with higher domestic production of livestock and vegetable oils, larger production of lard, tallow, and greases will supply part of the deficit, and some additional oil may be obtained from corn and miscellaneous pits and seeds.

The Department endeavored to advance the oil-crops program through AAA program changes and price supports. Farmers who wished to plant extra acres of peanuts for oil could devote to peanuts as

much as half of their normally required conserving acreage and still get their conservation payment, provided they planted a cover crop on the land afterwards. This contributed to the war effort and also protested the land from erosion, because neither the root systems of peanuts nor those of soybean plants hold the soil very well. Cover crops planted after the oil crops have been harvested build soil power for meeting still higher oil-crop goals in future years.

There was enough seed for all oil-producing crops, but getting the supply where it was needed required planning and action. Farmers who had difficulty in obtaining seed of the proper oil-producing variety adapted to their local conditions applied for help to their county AAA committees. Usually the committees were able to indicate where such seed could be obtained. Many farmers wanted information on how to grow these oil crops, since the requirements vary by localities. County agents gave them necessary technical advice. These helps, along with the announced price supports, got us further toward the goals than at first seemed possible, and laid a basis for greater production in 1943.

OIL-CROP PRICE SUPPORTS

The Department undertook to see that all farmers who raised these oil-producing crops would receive a fair return for their work. Specifically, it promised they would receive for peanuts grown for oil at least $70 a ton for Class A Virginias, at least $78 a ton for No. 1 Runners, and not less than $82 a ton for U. S. No. 1 White Spanish. The highest price supports were for the best oil-producing varieties.

Price support offered for 1942 crop soybeans was likewise based on the oil content. For example, the price support for U. S. No. 2 yellow high-oil content soybeans was $1.60 a bushel, farm basis. The State agricultural experiment stations named the exact varieties, with the approval of the War Boards. Beginning January 1, 1943, the purchase price of soybeans will increase 1 cent per bushel per month. Farmers who store their beans on the farm to June 30, 1943, will be entitled to a storage allowance of 7 cents per bushel in addition to the support price. A similar price-supporting program was in effect for 1942 crop flaxseed. Loans were to be made available at an average of at least $2.20 a bushel, farm basis, with location and grade differentials. Also, the Department authorized AAA participants to count toward meeting the minimum soil-conserving requirement new seedings of grasses and legumes when flax was used as a nurse crop.

Farmers in the South are not receiving the same price for soybeans as farmers in other parts of the country, because the South does not produce many high-oil content soybeans. The support price to southern farmers was $1.50 a bushel for green and yellow medium-oil-content beans, and $1.40 a bushel for brown, black, and mixed low-oil-content beans. The rates for high-oil content beans were available on proof that the beans produced in their area were of the high-oil content standard.

Oil from peanuts probably will be used to replace imported oils for shortening, cooking fats, and salad oils. Peanut oil can be substituted in an emergency for other oils in making explosives and other vital

products. Linseed oil is essential in making paint to protect our ships and tanks. Soybean oil is used in many foods, in soap, and in making paints and varnishes.

The increased acreage of peanuts for oil did not reduce the amount of peanuts that the grower could sell for food. Just as in the past he could sell for food, at a price higher than that prevailing for oil, all the peanuts he could grow under his AAA allotment.

Though the Department had asked cotton farmers to plant up to their full cotton-acreage allotment in 1942, it advised them to plant peanuts for oil wherever possible, even if it meant that they could not meet their full cotton-acreage allotment. Peanuts normally will yield three times as much oil per acre as cotton. Some recent cooperative studies in two of the principal peanut-producing areas in North Carolina and Georgia showed that on the basis of the price supports set for peanuts and 85 percent parity for cotton, returns per man-hour of labor should be about equal for cotton and for peanuts grown for oil in 1942. They showed also that returns from peanuts grown for oil should greatly exceed returns from corn.

COMPREHENSIVE PROGRAM ANNOUNCED

In August, with the approval of the President, the Department announced a program involving prices, marketing, and processing of this year's crops of soybeans, peanuts, cottonseed, and flaxseed. Operated by the Commodity Credit Corporation, the program seeks (1) to implement price supports announced early in the year as an inducement to farmers to increase the production of oil crops to meet wartime military, lend-lease, and civilian needs, and (2) to preserve the OPA ceiling prices of vegetable-oil products.

In response to the price-support program farmers planted record acreage of peanuts, soybeans, and flaxseed. The yields per acre of these crops, and also of cottonsed, will be close to the recent high records. Vegetable oils produced from the four principal oilseeds will total about 4 billion pounds, as compared with 2.6 billion pounds produced in 1941–42. Production of cake and meal will be about 6.5 million tons as compared with 4.1 million tons in 1941–42.

The Commodity Credit Corporation will purchase and resell vegetable oilseeds and oilseed products through contracts with processors, refiners, and bleachers who agree to pay not less than specified prices for oil crops, crude oil, and linters. These minimum prices are designed to yield to producers of soybeans, peanuts, and flaxseed for oil not less than the support prices announced last winter, and comparable returns to producers of cottonseed.

To maintain price ceilings on vegetable-oil products, crude cottonseed, soybean, and peanut oil purchased by the Commodity Credit Corporation will be resold at a reduction in price of one-half cent a pound to refiners and other manufacturers of vegetable oils.

Besides maintaining ceiling prices on oils and oil products, the program will make oil meals and oil cake available to livestock producers and feeders at reasonable prices in order to induce increased production of meats, milk, and eggs, and to conserve the supplies of corn and other feed grains.

Goals for 1943

Goals outlined for farm production in 1943 will result, if realized, in a total output approximately 1 percent above that estimated for 1942. They place increased emphasis on livestock and on the crops needed most urgently to meet military and lend-lease requirements.

Farmers may not be able to equal the crop production of 1942, which was a year of exceptionally high yields per acre; but a large supply of feed grains carried over from 1942 and from previous years will permit them greatly to expand their output of livestock and livestock products.

Acreages suggested in the goals come to about the same total as that of last year. Average yields on this acreage will give a crop out-turn equal to about 86 percent of the large output of 1942. Goals for the production of livestock and livestock products, on the other hand, look toward an output 10 percent greater than last year's.

The goal for hogs calls for an increase of 10 percent in the pig farrowings in 1943 and also for the marketing of hogs at heavier weights. The pork output may exceed that of 1942 by as much as 22 percent. This increase, however, will be the result partly of 1942 farrowings carried over.

Beef output measured in terms of live weight slaughtered will probably be 7 percent above that of 1942. This increase in beef will not require any material decrease in the number of cattle on farms.

The goal for sheep and lamb slaughter is practically the same as the sheep and lamb slaughter of 1942. Numbers of sheep on farms decreased in 1942, but a favorable lamb crop in 1943 would reach the goal with little further reduction in breeding stock.

Poultry producers are being asked to increase their production of chickens for meat by 28 percent, to produce more turkeys, and to increase egg production by 10 percent over that in 1942. Even this will not be sufficient, though it will reflect this year's large increase in the number of chickens saved and also a continued high rate of lay per hen. Civilian egg consumption may have to be slightly less in 1943 than it was in 1942, so that lend-lease and military requirements may be filled.

The goal for the total output of dairy products, measured in terms of milk, is slightly above the quantity actually produced in 1942, which was nearly 120 billion pounds. Butter production, which will depend materially on the need for other manufactured dairy products, may be no greater than in 1942. Output of cheese and dry skim milk, on the other hand, must be substantially greater if the lend-lease needs are to be met. Dairy cow numbers will be somewhat greater than at the beginning of this year, but heavy feeding will depend upon adequate price incentives. Nevertheless, civilian consumption of dairy

products will be below that of 1942, and will involve some adjustment in the type of products consumed.

Production of cereals in 1942 should be ample to meet all requirements. Farmers have been asked to reduce their wheat seedings somewhat so that they will have more land for other crops. At average yields, the acreage requested will give a crop only two-thirds as large as that harvested in 1942. This, with our large carry-over, however, will be ample for expected needs. Any difficulties of supply, if such difficulties develop, will be limited to particular types of wheat for special uses.

Total requirements for cotton in 1943 seem likely to fall within a range of from 13 to 13½ million bales or about the same as in 1942. Enough can probably be provided along with a reasonable carry-over by growing a total of 22½ million acres. Production of the longer staple cotton is to be further expanded.

Goals for tobacco call for an acreage equal to that of 1942 for all types except burley. It seems desirable that the burley acreage should be 10 percent larger.

Farmers have been asked to increase their acreage of dry beans and peas so that the production of these crops will be at least as high as that of 1942. The goal set for rice, if yields are normal, will maintain production at a high level, and enable the United States to continue supplying the Caribbean and other areas with some rice to offset their interrupted rice imports from the Orient.

Farmers have been asked to maintain their flax acreage for last year, to increase further their acreage of peanuts, and to reduce their acreage of soybeans by 1.9 million acres so that production of beans for oil will be in line with available processing facilities. Production of cottonseed oil may be smaller, but the Department hopes that this difference will be made up from oil from an increased acreage of peanuts. It urges farmers to shift as much cotton acreage as possible to the longer staple varieties.

Normally the United States produces about one-third of its sugar supply. Growers have been asked to maintain their production of sugarcane and sugar beets at the high level established in 1942, equivalent to approximately 2.4 million tons of sugar. Larger sugar production would be desirable; but the difficulty of getting labor for sugar-beet fields and the fact that all processing facilities in some sections are now being utilized are limitations. The sugar production recommended for 1943 is considered a maximum.

Goals for canned vegetables, which must allow for the availability af tin, consider the nutritive value of vegetables. They look toward packs as high as those of 1942 in such crops as tomatoes, peas, and snap beans. As told more fully later in this report, the goals program encourages the production of fresh vegetables near points of consumption, and asks growers to shift from types with relatively high requirements for labor and shipping facilities. The total output of fresh fruit cannot be altered greatly from year to year; but efforts will be made to dry as large a portion of the crop as possible.

Europe's Food

In spite of mounting difficulties in obtaining reliable information the Department's Office of Foreign Agricultural Relations has continued to follow developments in agricultural and food conditions in Europe during the third year of war. It has been able to keep a record of current levels of food consumption in the most important countries and to form a general picture of developments in agricultural production. It has also done an important part of a detailed statistical analysis of Europe's pre-war balance of foods and feeds. The results of these studies are background material for quantitative evaluation of Europe's wartime food situation and its possible post-war needs.

As pointed out in last year's report, the Department's interest in these problems is not merely academic. Food is a vital factor in any war and will play an important part in post-war reorganization, relief, and reconstruction. Our long-range agricultural policy, while most immediately determined by the requirements of our own war effort and that of our allies, will benefit from an early visualization of current and prospective supply and demand conditions in the world at large.

On neither side has the food situation thus far seriously interfered with the war effort or with morale in the belligerent countries, although food conditions have deteriorated in the Axis area this year.

The food situation in the United Kingdom was affected by the outbreak of war in the Pacific and the entry of the United States into the Atlantic struggle. Primarily the food problem of the United Kingdom is one of shipping, the difficulties of which inevitably affect the British food supply. This year, however, instead of reducing consumption levels to below those of 1941, the shipping shortage has simply cancelled an improvement that had been under way. Allowances of fats and sugar, which had been increased in November 1941, were brought back to their previous level in January 1942. Bread continues unrationed, but can now be obtained only either as wholemeal bread or at 85 percent extraction—incidentally, an optimum extraction percentage from the nutritional point of view.

On the other hand, the British have expanded their system of factory canteens and worker restaurants. Food distribution through these channels, over and above the ordinary ration, is larger than it was a year ago. The total caloric intake, however, is somewhat below pre-war levels. Meantime, increased employment, extended working hours, and increased expenditure of energy have increased the physiological requirements. While the armed forces are well fed, civilian consumption as a whole is restricted.

The population of the United Kingdom still depends heavily for its existence, and for its power to wage war, on food from overseas.

Because the enemy has captured important regions, areas still open to the shipping of the United Nations have become more vital as sources of supply. This has tended to magnify the position of the United States and Canada in the British food-supply picture, since North America is the closest source of many food items badly needed. The tighter shipping situation has placed increasing emphasis upon concentrated products, such as dried eggs, dried milk, and dried fruit; cheese and cured pork have prominent positions in the supply program. But shell eggs, fresh fruit, and other "watery" products find no place in the cargo ships.

Agricultural production in Great Britain has made headway since the outbreak of the war. In pre-war years the United Kingdom produced only about one-third of its total food requirements; at present the share of domestic foods in the total British food supply is appreciably larger. Since 1931 the arable acreage has increased 6 million acres and reached 18 million acres. Emphasis has been placed upon potatoes and wheat, and also on other grains, primarily for the maintenance of the fluid-milk supply.

Partly by virtue of special benefit payments, the output of potatoes and of wheat has been maintained at unusually high levels. It has not been possible, however, to expand feed-grain production sufficiently to offset the loss of imported feeds. This explains the feed priorities granted milk producers and the heavy dependence upon pork and dried eggs from North America. The numbers of hogs and poultry have been forced down, and may go lower.

DOWNTREND IN CONTINENTAL EUROPE

In most continental countries the food situation has deteriorated through the third year of war. The trend of rations has been downward; more countries and products have been included in the restrictions. Germany, whose food consumption was relatively high in the first 2½ years of war, had to reduce its rations of bread, fats, and meat in the spring of 1942 and to curtail its food consumption generally in view of uncertainty in the 1942 crop outlook and the reduction in important reserve stocks. Since April 1942 most flour in Germany has been milled to 100 percent extraction. The potato supply for the urban population during the winter and spring of 1941–42 appears to have been reduced considerably from that of 1940–41, in which crop year, however, the consumption had increased greatly over that of peace years. There is no indication that the food position in Germany is desperate, but it certainly has become uncomfortable.

Restrictions have been further tightened in Italy. The difficulties in the Italian food situation appear to result largely from the Government's inability to collect and distribute equitably the available supplies. Farmers and people with access to the thriving black market occupy a privileged position. The brunt of restriction must be borne by urban people who have no connection with the farmers or cannot afford to pay bootleg prices.

In France, likewise, existing difficulties are in large part due to the inequalities of distribution. Substantial German requisitions have played an important role. Peasants as a class and the more well-to-do

city dwellers appear to be in a relatively favorable position. The poorer urban population is in considerable distress. Agricultural production, despite the wartime declines, is still, however, of formidable proportions. The same pattern of distribution also prevails to some extent in the Low Countries; the food situation in the Netherlands is measurably better than in France; in Belgium, worse. Norway and Finland continue to experience painful food shortages. Central Poland—a direct German responsibility—remains one of the worst problem areas on the Continent. Conditions in Spain are extremely unsatisfactory.

Famine conditions have arisen in Greece, notably in the metropolitan area of Athens, in the Peloponnesus, and on the Aegean Islands. Parts of Yugoslavia are in serious distress. In Hungary, Rumania, and Bulgaria, restrictions on food consumption have been imposed or intensified in the urban areas. In general, however, it seems that the consumption of food in the rural districts of these countries, where about 80 percent of the population lives, does not differ from what it was in unsatisfactory years before the war. The food situation appears to be serious in the Axis-occupied parts of the Soviet Union. Sowings there for harvest in 1942 apparently were much below normal. Shortages of draft power and farm implements, the general destruction wrought by the war, and the removal of livestock cannot be easily overcome. German efforts to satisfy the Axis armies on local supplies have complicated conditions.

In Switzerland, Sweden, and Denmark the food situation continues fairly satisfactory although a certain tightening has become evident.

The considerable reductions in food consumption which have occurred in continental Europe since the outbreak of war are a joint result of developments in domestic agricultural production and in foreign trade in foodstuffs and feedstuffs. For most countries imports have been severely cut or even eliminated, and the resulting difficulties are proportionate to the degree to which these areas depend ordinarily on foreign supplies. Moreover, Germany has demanded considerable food contributions from the occupied or otherwise dominated countries, and its takings have aggravated the food difficulties of these countries.

FARM PRODUCTION IN EUROPE

As to domestic agricultural production in continental Europe since the outbreak of the war, it is difficult to generalize. In a number of countries there have been important declines, but there have also been increases in some products. Most countries are making strenuous efforts to raise or at least to maintain their farm output. Shortages of labor and of draft power have been a handicap. Weather conditions for the crops of 1940 and 1941 over wide areas were rather adverse, and both 1939–40 and 1941–42 had long and hard winter seasons. Crops in 1942 may be affected by the scarcity of phosphate fertilizer which has existed since the outbreak of war. Some countries have shortages of other fertilizers as well. In France, Poland, and parts of southeastern Europe, actual war operations have affected

and disorganized farm production in many ways, and the transport problem throughout the Continent has added to the difficulties.

On the whole, since the outbreak of war, continental European production of grains has declined, while production of root crops (including potatoes and sugar beets), of vegetables, and of oilseeds has increased. Crops of roughage in some countries, because of unfavorable weather conditions, have been smaller. Fruit crops have been considerably below normal as a result of the severe freezes of 1939–40 and 1941–42, and in some countries because of deficiencies in fertilizer, spray materials, and labor.

Livestock production has been most affected in northern and northwestern Europe—a region which normally depends to a large extent on imported feed. Reductions in livestock numbers, though on a smaller scale, have been reported also from central Europe. In the surplus-producing East, where livestock production is based exclusively on domestic feed supplies, the changes from pre-war production are not important. The largest declines in European livestock are in hog and poultry numbers. In cattle the curtailment is less extensive. The sheep and goat population on the Continent appears to have been well maintained or even increased.

As a result of the declines in livestock numbers, production of milk and eggs has shown a decided drop—reinforced in the case of milk by a reduction in milk yields. The reduction in livestock has temporarily added to the supply of meat. By now the emergency slaughter has curtailed the livestock population to a level more nearly supportable on a domestic-feed basis; therefore it is not to be expected that such additional supplies will continue to accrue at anything like a comparable rate. In general, the producing capacity of the Continent's livestock industry has been reduced.

To what extent total food production on the Continent since the outbreak of war has changed is difficult to determine. A shift from the production of foodstuffs of animal origin toward increased production of foodstuffs of vegetable origin is evident. This reduces the loss of calories involved in the conversion of feedstuffs into livestock products and makes agriculture more productive food energy. On the other hand, the fuel value of food is not its only value; the composition of the diet is significant, and the decline in the output of livestock products has affected the composition of the diet adversely.

Broadly, it may be said that since the outbreak of the war, the production of food on the Continent of Europe has been reduced quantitatively as well as qualitatively. Not all of the decline can be traced back to the war. Weather developments have been an outstanding influence. The reduction that has occurred in domestic food output, along with the virtual elimination of imports from overseas, has materially reduced the total food supplies available. If, moreover, the inequalities of distribution as between victor and vanquished, rural and urban population, rich and poor, and other special factors are taken into consideration, it will be understood why conditions on the Continent are ranging from a favorable standard to one of acute distress.

Agriculture in the Orient

Equally important to us now is the food situation in the Far East. Japan and the areas under Japanese control are on the whole self-sufficient in principal foodstuffs and likely to remain so in the immediate future. Not all of the countries in the Japanese-dominated group are entirely self-sufficient in rice, the principal food item, but other countries, relatively easy of access, produce large surpluses.

Next in importance to rice as a food in Japan proper are fish, wheat, corn, vegetables, and fruit. Other items, such as wheat flour, animal and dairy products, and a wide variety of others were imported before the war. These, however, were essentially luxuries, consumed largely by resident whites and wealthy natives. Lack of these formerly imported food specialties does not lessen Japan's self-sufficiency or inflict any hardship on the native population. At the moment, the only threat to the Japanese diet is the possibility that the supply of fish may be affected by war activities in the waters of the Far East. Interruption of Japan's sea-borne trade would be a greater danger, but the lines of communication are quite short.

Normally Japan produces about 80 percent of its rice and imports virtually all of the balance from other parts of the Japanese Empire. Japan now controls French Indo-China, Thailand, and Burma; their large exportable surpluses of rice add to Japan's resources.

Other grains consumed in Japan supplement rather than replace rice, and the Japanese position in these other grains is strong. Wheat production has increased in Japan in recent years to the point where there is a small surplus of exports over imports. Soybeans are the principal leguminous crop, used in Japan as a source of both food and fertilizer. Japan produces only 30 percent of her soybean requirements but can import the remainder from Manchuria and Chosen. Its output of tuber and root crops, vegetables, and fruit is considered quite adequate for domestic requirements.

Self-sufficiency is not necessarily synonymous with good nutrition or a high living standard, but in Japan its attainment has resulted in better diets. During the course of several decades, the level of food consumption in the Japanese Empire has risen. Reduced to caloric values, the food consumed by the Japanese compares well with that of the people of other countries. However, the quality of the food, measured by western standards, reveals glaring deficiencies. Cereals, chiefly rice, make up a disproportionate amount of the total. Less than 4 percent of the caloric intake is of animal origin, as against 30 to 40 percent in western Europe. But despite probable deficiencies in effective protein, minerals, and vitamins, Japan has probably the best-balanced diet among Oriental people.

OUTLOOK FOR JAPAN'S RICE SUPPLIES

Several factors might possibly restrict Japan's rice supplies. The large increase in production in Japan proper has been achieved by intensive cultivation, based on the world's largest per-acre utilization of fertilizers. In recent years the farmers have shifted from vegetable fertilizers, such as soybeans, rapeseed, and cottonseed oil cake, to various chemical fertilizers. Now war needs have increased the demands on the chemical industry; it is therefore likely that fertilizer shortages may somewhat affect domestic rice yields.

This will not present a problem if Japan is able to import rice from Chosen, Taiwan, occupied China, Indo-China, and Thailand. Interruption of supplies from the latter two countries in 1942 would probably have an adverse effect on Japan's rice situation by the summer of 1943. Loss of supplies from Chosen and Taiwan would be more serious, as these areas provide one-sixth of the rice consumed in Japan, but both are nearby.

Unlike German aggression in Europe, which has brought malnutrition or starvation to every conquered area, Japanese occupation may not have this effect on countries of the Far East. Most of the areas now under Japanese control are self-sufficient in basic foodstuffs or nearly so. Many of them have surpluses for export. Agricultural production in Manchuria has declined since the invasion of 1931, and the exports have fallen below the volume Japan would like to receive; but the production is ample for domestic requirements. Occupied China is normally self-sufficient in foodstuffs; it has a surplus of rice and imports a small quantity of wheat and wheat flour. Food stocks in most rural sections are believed to be adequate at present; supplies in the cities, however, are probably somewhat below normal.

Before the war the Philippines maintained a favorable trade balance of agricultural products, but the islands are not fully self-sufficient. Large surpluses of sugar and coconuts more than offset imports of a wide variety of foods in relatively small quantities. In an emergency the Philippines' food output can be increased with little difficulty to meet all basic requirements if military activities do not interfere. The Netherlands Indies can produce enough food, except fish, in 1942 to meet all the requirements of the native population. Of the occupied countries, British Malaya is the least well situated. Normally it imports about two-thirds of the rice which it consumes. There is enough rice in Thailand alone, however, to make up this deficit.

Cooperation With Latin America

For several years the Department of Agriculture, in cooperation with the other American republics, has been working to encourage increased production in the Western Hemisphere of agricultural commodities not raised in the United States, with the twofold objective of assuring close-to-home supplies of products that are of strategic value in wartime and of providing Latin America with cash crops that can be used in increasing the volume of inter-American trade. The outbreak of war with the Axis and Japan's quick conquest of the Far East has stimulated this program greatly.

The loss of Java, Malaya, and the Philippines virtually ended United States imports of rubber, abaca, and several spices and essential oils. The spread of the war also seriously threatened customary sources of such Asiatic and African products as jute, sisal, palm and other vegetable oils, and cacao. While projects to develop production of most of these needed commodities under plantation conditions in Latin America were well advanced, few of them were being grown commercially in the American Tropics. Most of the products mentioned, however, are found in the wild state in Latin America. One effect of the Japanese attack has been to place emphasis on emergency production from wild plants of many products not yet available from newly established plantations in Latin America.

In this effort, the Department of Agriculture has an important role. In addition to sponsoring a number of projects, it provides technical assistance to various other Government agencies from among its scientific personnel, and, through the Office of Foreign Agricultural Relations, serves as a clearing house and coordination center for all the Government departments and agencies interested in inter-American agricultural matters.

One of the first emergency projects to be undertaken after the attack on Pearl Harbor was a plan to increase the production of rubber from wild trees in Latin America. In many parts of the American Tropics are literally millions of wild rubber trees—both the *Hevea brasiliensis*, which is the so-called rubber tree of commerce, and the native *Castilla* species, which has never been domesticated but yields some rubber for local use. Some 30 years ago, when the Amazon Valley was the leading rubber-producing region of the world, its annual outturn amounted to almost 50,000 tons a year. In recent years it has produced less than a fifth of that amount, but prospects are that production can be increased until it represents a substantial part of the rubber needed by the United Nations.

To find the wild trees and devise methods for drawing on their liquid riches, the Office of the Coordinator of Inter-American Affairs early in 1942 dispatched to Latin America a group of trained rubber

technicians under the direction of a member of the staff of the Department of Agriculture. Later in the year the project was taken over by the Board of Economic Warfare; and the Rubber Reserve Company, after reaching agreements with several Latin American countries to buy all rubber produced in the next 5 years, sent purchasing agents to Latin America to support the advance corps of technicians.

Closely related to this emergency activity is the Department's program, in progress since 1939, for the establishment of plantation rubber cultivation in Latin America. The prospect of a continuing rubber industry after the present emergency ends is expected to encourage the rubber-producing countries to make the investments and population shifts necessary in obtaining every possible ton of wild rubber. There will be no rubber production from the new plantations for several years, but good progress has been made in increasing plantings.

Another inter-American project of interest to the Department is that dealing with the United Nations' supply of plant fibers, which in addition to being agricultural products have important farm uses. Abacá plantations established by the Department in the Republic of Panama several years ago are now coming into production, and further plantings have been made in Costa Rica.

The last year has seen the completion of a survey of fiber resources of Mexico and Honduras by Department technicians lent to those countries. The most recent project is the sending of a field party to several of the Caribbean republics to obtain information on fiber supplies now available and to develop new fiber production. This party was organized by the Board of Economic Warfare, with a Department of Agriculture fibers specialist as leader.

Two Department staff members and two representatives of the Brazilian Ministry of Agriculture compose a field party now stationed in the Amazon Valley to introduce the cultivation of rotenone-bearing plants, the roots of which yield one of the most important insecticides. The need for this product was increased by the cutting off of imports of Far Eastern derris root, which supplies the same insecticide.

Other essential materials in which the Department is interested in Latin America include babassu, citicica, perilla, and several other vegetable oils; several drug products, most important of which is quinine; essential oils used in perfumes; several of the spices; and such food products as sugar, cacao, coffee, and bananas, for all or part of which the United States depends on imports.

Coordinated agricultural production within the Western Hemisphere received emphasis at the second inter-American Conference of Agriculture, held in Mexico City in July 1942 by invitation of the Government of Mexico. It was planned to give practical expression to many of the resolutions approved at the third meeting of the Ministers of Foreign Affairs of the American republics, held in Rio de Janeiro in January of this year. The program recognized the fact that the southern part of the Western Hemisphere is rapidly becoming a major source of tropical and subtropical agricultural commodities necessary to wage a successful war. It included discussion of post-war agricultural cooperation within the Americas.

ESTABLISHING EXPERIMENT STATIONS

The Department is cooperating with Latin American republics in establishing agricultural experiment stations. The first agreement for this purpose was signed in April 1942 with the Minister of Finance and Commerce of Peru. Similar accords have since been reached with the Republics of El Salvador and Nicaragua. The Peruvian agreement may be regarded as a model for accords of this type; it calls for the establishment of an experiment station at Tingo Maria in the Andean foothills of the Republic, where the National Government already has a colonization project.

A development project which the Department helped launch in 1941—an agricultural corporation organized in Haiti—has made considerable progress in the last year. Incorporated as the Société Haitiano-Américaine de Développement Agricole, the corporation began its existence in August 1941. Its objective is the general development of Haitian agriculture, with emphasis on export crops that will help the densely populated little Republic in building up its foreign trade. Already SHADA, as the corporation is known, has interested itself in the production of rubber, lumber, naval stores, essential oils, fibers, spices, and rural handicrafts. It has become one of the country's largest employers with 3,500 workers, all recruited in Haiti except a few technicians, and it is operating a large forest and 2 plantations.

There is a similar development in Ecuador. Scientists from this Department, organized as the Ecuadorian Economic Resources Mission, completed a survey for the purpose in 1942. On the basis of the group's findings the Export-Import Bank of Washington advanced funds to organize a corporation owned by the Republic of Ecuador. The corporation will endeavor to expand the country's production of crops for export, particularly plantation rubber and high-quality cacao. Ecuador was once the world's leading cacao producer.

Another inter-American development project is contemplated for Bolivia. Ground work for it has been laid by a survey of agricultural and mineral resources and transportation problems of Bolivia. Representatives of the Department of Agriculture, the Department of the Interior, the Department of State, and the Federal Works Agency cooperated in the survey. Soil scientists from this Department recently spent several months in Venezuela on loan to the Venezuelan Government for an investigation of soil-erosion problems and conservation possibilities.

This Department outlined the original plans for the proposed Inter-American Institute of Agricultural Sciences, formerly called the Institute of Tropical Agriculture. At the request of the Pan American Union the Department assigned a party of technicians to make a survey of sites offered by several of the tropical American republics. Selection of the site and actual establishment of the Institute is expected before the end of 1942. Meanwhile the Department is helping to design buildings and arrange library facilities for the Institute.

RECIPROCAL TRADE AGREEMENTS

The United States continues to create new opportunities for inter-American commerce through the negotiation of reciprocal trade agreements. Because of the important place of agriculture in all of these, this Department is represented on the Committee for Reciprocity Information, which compiles the preliminary information used in the negotiation of an agreement, and on the Trade Agreements Committee, which oversees the actual negotiations.

In October 1941 the United States and Argentina signed a trade agreement that represented the first accord since 1853 covering trade relations between the two countries. It was of unusual importance because of Argentina's place as the largest agricultural exporter of Latin America and because it was the first inter-American trade agreement involving two Temperate Zone countries whose agricultural production is similar.

A number of the specific concessions made by Argentina will be of direct advantage to farmers in this country. United States agricultural products on which concessions were obtained include fresh apples, pears, and grapes; dried pitted peaches, apples, pears, and cherries; prunes and raisins; unshelled walnuts; and tobacco products. Agricultural products from Argentina on which reductions in duties or excise taxes were made include casein, neat's-foot oil and stock, tallow, oleo oil and stearin, and veal, flaxseed, canary seed, corned-beef hash, broomcorn, carpet and coarse-apparel wools, cattle hides, and dog food.

In May 1942 the United States and Peru signed a trade agreement covering a large part of the agricultural trade between the two countries and setting the stage for increased importations from Peru of products which the United States either does not produce at all or produces in insufficient quantities to supply its own needs. Among the Peruvian products covered in the agreement were barbasco root, pyrethrum, long-staple cotton, sugar, coca leaves, hemp and flax fiber, cinchona bark, and others. Peru, in turn, made tariff adjustments to encourage importation from the United States of such agricultural products as wheat flour, rolled oats, certain canned vegetables, fresh apples, pears and plums, walnuts, and a variety of dried and canned fruits.

Early in 1942 a supplementary trade agreement with Cuba went into effect. It reduces the duty on Cuba's most important product, sugar, from 90 cents per 100 pounds to 75 cents and contains a formal assurance that every effort will be made to maintain Cuba's position in the United States market as a supplier of sugar.

On June 1, 1942, the United States had entered into trade agreements with 13 of the other American republics, and several others were in the process of negotiation. In addition the inter-American trade structure has been bolstered for the war period by similar agreements between various of the Latin American republics.

OUR TRADE WITH LATIN AMERICA

During 1941 the value of two-way trade in agricultural products between the United States and Latin America showed an increase of more than 73 percent over that in 1939, the last pre-war year. United States imports of farm products from Latin America were up 74 percent, and the value of this country's agricultural exports to the other American republics showed a 71-percent increase. Considering both agricultural and nonagricultural items, the increase in the value of two-way inter-American trade amounted to 83 percent. While some of the increase was the result of higher prices, the larger part represents an increase in quantities of goods exchanged. In early 1942 the tight shipping situation began to have an effect on commerce in all commodities except those essential to the war effort, but inter-American trade continued substantially above the pre-war level.

Wartime Foreign Trade

The role of the United States as purveyor of food to the United Nations has become the decisive factor in our agricultural exports. The lend-lease program has become the most important single instrument in foreign trade.

Prospects in the first months of the war were for a drastic curtailment of our agricultural exports for the duration. Lend-lease exports entirely changed the situation. Other factors, however, have been important. Among them are the dependence of other countries upon the United States for products no longer available elsewhere; the supplying of troops of the United Nations in many parts of the world; and the demand created for our products in certain areas that have increased their exports to us.

Farm exports from the United States for the year ended in June 1942 exceeded 1 billion dollars in value. They were 40 percent higher in value than the average for the 10 preceding years. In the first year of lend-lease operations the Agricultural Marketing Administration expended approximately 800 million dollars for supplies destined mainly for shipment to the United Nations. The index of export quantity for the fiscal year 1942 showed a decline of approximately 20 percent. This apparent contradiction may be explained in part by rising prices, in part by the decline of nonfood exports, and in part by the additional emphasis placed on concentrated foods. Cotton, for example, once constituted almost half the total value of agricultural exports. In fiscal 1942 it amounted to only 9 percent. Its preponderant effect on the total exports is evident. All other farm exports together increased greatly over the average for the preceding 10 years, the rise in value being equal to about 140 percent and in quantity to 64 percent. Many of the commodities which were once our export staples have shrunk to relatively unimportant places. Formerly minor items, especially foods that can be concentrated, have risen to new high levels.

Cotton and tobacco once normally constituted nearly two-thirds of the total. Now, though still in the first and second places, they constitute no more than one-fifth. Equal or greater in value are our exports of dairy products, egg products, lard, and pork. Fruits are no longer among the major exports. Prunes and raisins have retained importance, and orange exports have survived in about their pre-war volume. But fresh apples, pears, and grapes, and canned fruits have declined to minor places. The principal grain exports, except rice, have also declined. At the same time, dried beans and peas, grape sugar, and corn sirup have become important export commodities, while tomatoes and baked beans have taken first place among canned vegetables. The changes reflect the effort to ship high food value in little space.

In some commodities increased domestic requirements have offset export declines. For example, we need more long-staple cotton. Our supplies of tobacco, though tobacco exports are down from prewar levels, are considered no more than adequate to meet increased domestic requirements for most types, and to provide reserve supplies for post-war trade. Certain other commodities have not been cushioned in this way against reduced export demand. Wheat is the outstanding example. Among fruits the situations vary, but conditions of surplus are not uncommon in canned, dried, and otherwise processed fruit, both for domestic and foreign consumption. Examples of increased production matched by increased demand are dairy products, eggs, poultry and pork, both the domestic and the export demand for which is extremely large.

This country has been sending important quantities of foods not only to the United Kingdom and more recently to the Soviet Union, but also to many other parts of the world. Among them are the areas which form our nearest outposts, such as the Panama Canal Zone, the islands of the Caribbean, the Republic of Panama, and Iceland. More distant lands are receiving food from the United States. They include Egypt, the Near East, and India. Many of our farm products are going in increasing quantities to Central and South American countries. Among the neutral countries of Europe, Switzerland has remained a not-unimportant market for a small number of products. Limited quantities of a few commodities have gone to Sweden and Portugal. The African colonial territories of Great Britain and of the occupied countries of Europe have received some.

The greatest loss to United States farm exports since that caused by the domination of Europe by the Axis has resulted from Japanese occupation of much of the Far East. In 1941 nearly 64 million dollars worth of United States agricultural exports, or 10 percent of the total, went to Japan, China, Hongkong and Kwantung, the Philippine Islands, Burma, the Netherlands Indies, French Indo-China, British Malaya, and Thailand. These markets may now be considered closed. In the first 3 months of 1942 less than one-half million dollars' worth of farm commodities went to the Far East from the United States. Even exports to Australia and New Zealand in 1942 have been at a much lower rate than in 1941.

Changes in imports of farm products similar to those grown in the United States have been significant, though less marked than changes in the exports. Three factors have principally dominated the import situation: (1) The increased need for certain industrial raw materials; (2) increased consumer purchasing power, which has increased the demand for various food products and other consumer goods; and (3) our growing dependence on imports from Latin America. The shipping shortage has modified all of these factors. Empty bottoms return from some areas to which they have carried this country's exports. Full loads return from others. Regulation of imports by governmental and intergovernmental controls has been set up to rationalize the import program as much as possible. Generally, nevertheless, the tonnage which can be made available in any particular area must still largely determine the volume of our imports of commodities originating there.

OUR IMPORTS OF AGRICULTURAL COMMODITIES

Our farm imports in fiscal 1942 were about 790 million dollars in value; they rose sharply during the year to a point nearly 50 percent above the average for the preceding 10 years. Prices played an important part in the advance, though less so than in the exports. In quantity the imports rose less than 30 percent. Wool accounted for half of the rise in value; wool imports were so large that for the first time they surpassed imports of sugar. Hides, molasses, casein, and cotton linters entered the country in unusually large amounts; these commodities are extremely important in the prosecution of the war.

All imports from the Far East reflected the impacts of the war. Before Pearl Harbor most of the commodities except silk which originated there were entering this country at above pre-war levels. Thereafter the volume steadily declined. Principally involved were rubber, manila fiber, copra, coconut oil, palm oil, and certain drugs and spices. In their place imports of certain products such as henequen and sisal and castor beans from Latin American countries increased. Essentially, in spite of the changes caused by the war, the upward movement in imports of farm products similar to those grown in the United States remained in line with the upward curve in all imports. The ratio between them has been about 25 percent for many years. It was about 25 percent in fiscal 1942. Oils coming from the Far East declined in the imports after Pearl Harbor.

Our neighbor nations in Latin America depend far more than we do on agricultural exports for the maintenance of their economies. They began to lose their export markets in 1939. Each new stage of warfare further curtailed their exports of corn, cotton, coffee, sugar, and other basic crops. Finally, only North America and the United Kingdom remained to them as major markets.

Now it has become necessary for the United States to restrict its imports of fruits, coffee, cocoa, and other commodities, and for the United Kingdom to curtail some of its imports from Latin America; hence, the Latin American nations face an extremely serious situation. They can find limited relief in greater production of the more essential commodities. Our purchases of rubber, babassu and other palm-kernel oils, kapok, other fibers, rotenone, oil, fats, and forest productions, together with increased purchases of minerals, will partially offset their loss of normal markets. But the relief will be only partial. Moreover, the southern nations will not share it equally. Some of them will not be able to divert their production to strategic commodities on a large scale. Others are concentrating on crops which take several years to come into bearing.

SURPLUSES PILING UP IN LATIN AMERICA

Large surpluses are piling up in many of the Latin American countries—surpluses of cotton, corn, wheat, coffee, and other basic crops. Bananas, melons, and other fruits, which cannot be stored for long, are finding only limited markets. Consumption at home or in nearby areas can be stimulated for some of these commodities. Such com-

modities as wheat and corn can be used to a limited extent for feed or even fuel. Stock piles in anticipation of post-war relief needs can be built to the extent that storage capacity permits. Considerable waste and destruction are nevertheless inevitable.

The United States has moved to assist these nations. It is employing several methods, for example loans which directly or indirectly offset some of the losses. Another method is the purchase of basic crops, not for use or immediate shipment, but for purposes of price and supply stabilization. The first case of this kind was the purchase by Commodity Credit Corporation of Peru's 1942 cotton crop. This purchase was incorporated in an agreement, which will encourage reduction of Peru's cotton acreage in future years. It contains other provisions whereby the Peruvian Government agrees to increase rubber collections and to cooperate with the United States Department of Agriculture in establishing an agricultural experiment station in eastern Peru. Similar purchase agreements with other Latin American nations are a possibility.

War's Impact on the Department

Meeting the problems of the war has obliged the Department to change its organization, to set up new service units, to broaden and alter its scientific and economic work, and to establish new relations with other public agencies. It has built on old foundations, particularly on its research and educational facilities, and on its machinery for getting farmer cooperation in Nation-wide crop adjustments. On this basis, however, it has had to develop so many new functions and to change its shape so much that the points of difference between the institution as it is today and as it was before the war are very striking. It will be useful to review this evolution.

Shortly after the war began in Europe, in September 1939, the Secretary of Agriculture appointed an advisory council composed of farm and business groups. This council undertook to focus the judgment of agriculture, labor, business, and distribution agencies on agriculture's problem in relation to the war. The Government had already created the War Resources Board to assist in industrial mobilization for the national defense. In May 1940 the President, under authority of the Army Appropriation Act of August 29, 1916, reestablished the Council of National Defense, composed of the Secretaries of War, Navy, Interior, Agriculture, Commerce, and Labor. The President also appointed an Advisory Commission to the Council of National Defense with a representative of agriculture on it.

This Department formulated and developed agricultural phases of the defense program. Its representatives served in a liaison capacity with the Defense Commission, with the War and Navy Departments, and with other Federal agencies. Agricultural specialists furnished information useful in improving the nutrition of the people, in accumulating raw materials such as wool, in negotiating the exchange of agricultural surpluses for rubber, tin, and other strategic commodities, and in locating defense industries. Meantime, with customary export outlets blocked, the Agricultural Adjustment Administration set about the task of helping farmers to supply the altered market. In November 1940 the Council of National Defense created the Office of Coordinator of Health, Welfare, and Related Defense Activities. The Department's Director of Extension Work became chairman of the Office's nutrition committee.

In the latter months of 1940 the United States recognized a close identity of interest with Great Britain and prepared to increase its shipments of foods and other war goods to the British. The Secretary of Agriculture asked farmers to enlarge their hog production and also their marketings of cattle and calves. These recommendations had British requests in view, as well as an increased home demand in defense and other industries. The President outlined his lend-lease

program to the Congress on January 6, 1941, and on March 11, 1941, the lend-lease bill became law. It provided foods for Britain to the extent in 1941 of more than 600 million dollars. Farmers produced them in a Food for Freedom program which the Secretary of Agriculture announced shortly after the passage of the Lend-Lease Act. Commodities from storage were on the docks the day Congress passed the measure.

Writing to the Secretary on May 5, 1941, the President requested the creation of an Office for Agricultural Defense Relations within the Office of the Secretary. This was recognition of the fact that one place for agriculture on the National Defense Advisory Commission did not adequately reflect agriculture's tasks and needs. The new unit, which came into existence immediately, studied what farmers require in labor, fertilizers, machinery, chemicals, and storage facilities, and presented the facts to priorities officials. This unit also had responsibilities with regard to transportation and marketing, and with regard to agricultural requirements for the Army and Navy and for defense industries. After the United States entered the war the OADR became the Office for Agricultural War Relations and acted increasingly in a liaison capacity with other war agencies.

In May 1941 the Secretary announced the formation of an Anglo-American food committee to supervise the joint efforts of the British Food Mission and this Department. In July 1941 the Secretary established USDA Defense Boards (since renamed War Boards) in every State and county to get the full cooperation of the Department's field personnel in all branches of the farm war effort. Soon afterward he appointed a committee of farm-organization leaders to cooperate with the official agencies. Under the Lanham Defense Housing Act (approved October 14, 1940), the President designated the Farm Security Administration as an agency to build temporary defense housing, some of it on farm land near defense projects. In July and August of 1941 the Department worked out National and tentative State production goals for 1942 and revised them later with the help of State agencies. The Department was well forward on the food front when the attack came on Pearl Harbor.

MOVEMENT TOWARD FULL WAR BASIS

After Japan's treachery of December 7, 1941, the Department moved quickly toward a full war basis. On December 13 the Secretary combined 17 of the Department agencies into 8 groups, each under an administrator. He asked these 8 administrators, along with staff officers of OAWR, BAE, and the Extension Service, to constitute the Department's War Board. Confirmed later by Presidential order, this reorganization streamlined the Department, brought related tasks together, simplified top administration work, and gave the whole institution a stronger sense of its total job. The Department's War Board established a program of frequent meetings and developed programs and instructions for the State War Boards. In February the Secretary announced a pooling of the Department's facilities with those of OPA in the fight against inflation.

In interagency war coordination the creation on June 5, 1942, of the Foods Requirements Committee, with the Secretary of Agriculture as Chairman, was a vitally important step. This committee has jurisdiction, under the general supervision of the chairman of the War Production Board, over the whole broad problem of food allocation. In the light of war needs it considers what should be produced, where it should go, and how it should be handled. It includes representatives of the State, War, and Navy Departments; the Board of Economic Warfare; the Office of Lend-Lease Administration; and the Office of Price Administration, as well as of the War Production Board and this Department. The job of servicing the Foods Requirements Committee and of acting as a channel to the Committee by all the agencies represented on it is performed by the Office for Agricultural War Relations.

Collaboration between the food authorities of the United States and of the United Kingdom has been the rule since the beginning of the lend-lease program. President Roosevelt and Prime Minister Churchill in June 1942 announced the formation of the Combined Food Board "to coordinate further the prosecution of the war effort by obtaining a planned and expeditious utilization of the food resources of the United Nations." They appointed the Secretary of Agriculture of the United States and the Head of the British Food Mission members of the Board.

The Board is responsible for planning with regard to the supply, production, transportation, disposal, and allocation or distribution of foods, of agricultural materials from which foods are derived, and of equipment and materials used in the production of food, wherever the United States and the United Kingdom have a common concern in these matters. Recommendations adopted by the Board are presented to the two governments for action. The Board is directed to collaborate with the other United Nations.

A joint staff of British and American personnel has been organized in Washington to carry on the work of the Board. The Office of Foreign Agricultural Relations is providing the American personnel of this staff.

It has been decided that problems of food management should first be studied by committees, and groups for this purpose are being organized along commodity lines. Committees have been set up in Washington to consider agricultural seeds, fats and oils, meat and meat products, spices, sugar, fruits and vegetables, and fertilizers. A committee is to be established to examine over-all problems of international food movement. In London, the Board has formed a tea-allocations committee and a committee on United Kingdom agricultural policy.

In London a body known as the London Food Committee has been established. It includes representatives of certain Dominion governments, who offer advice and information in regard to the requirements and resources of the British Commonwealth and certain other territories. An Interagency Committee in Washington provides for representation by the State Department, the Board of Economic Warfare, the Office of Lend-Lease Administration, the War Shipping

Administration, the War Production Board, the Agricultural Marketing Administration, the Foods Requirements Committee of the United States Government, the British Food Mission, the British Ministry of Agriculture, the British Merchant Shipping Mission of the Government of the United Kingdom, and the Combined Shipping Adjustment Board.

The total food supply of the United Nations has to be regarded as one great stock pile, to be used as the common needs dictate. In setting marks for American farm production the first step is to see what needs of the United Nations we must supply. The Combined Food Board is making the survey. It will report its findings to the Foods Requirements Committee of the War Production Board.

CALCULATION OF OVER-ALL REQUIREMENTS

The Foods Requirements Committee, on the basis of data from United States agencies, calculates the needs for our military forces and for our civilians. Combining our needs with those of our allies, it reports to the Department of Agriculture the total needs for the various crops and livestock. The Department then establishes goals for farm production. The national goals then will be broken down into State goals, and reported to the State USDA War Boards, whose members are the head officers of Department agencies in each State and County. Farmer AAA committeemen, elected by their neighbors, will translate the goals into crop and livestock schedules for each farm.

The AAA in the War Effort

Charting the grand strategy and the broad objectives of agricultural production is the Department's outstanding planning job. The fulfillment this year has been as noteworthy as the planning. The Agricultural Adjustment Agency has representation on the planning council, and bears part of the responsibility for translating the objectives into action. The production-adjustment front, long one of the AAA's major fields of operation, has now become the means of gearing farm output to actual needs.

The primary AAA job is to guide and assist farmers in producing the right commodities in the right amounts at the right time. It must help farmers also to make sure that the Nation will continue to have soil resources for the future. There is nothing to be gained, even temporarily, by production without thought of tomorrow's needs, which may be even greater than the present needs.

Heretofore the AAA adjustment measures, which include acreage allotments, marketing quotas, and soil conservation practices, have aimed chiefly to balance supplies with demands as a means of supporting prices so that farmers would receive a fairer share of the national income. This year the emphasis is on production for war needs. The AAA facilities are used to keep a few crops within national goals and to encourage production of all other farm products up to or above the goals—each commodity in the proper amount.

The demand has been sufficient to provide incentive for the production of some crops. In other commodities farmers have needed the protection of price-support measures. The risks involved in the increased production of these commodities have made it necessary that they should have assurance of being able to keep on producing. In cooperation with other Department agencies the AAA helps to furnish this encouragement.

More in evidence now than formerly is upward crop adjustment. Originally the task was primarily to get surpluses under control as preparation for the greater production of the things desired. Now we are getting production abundantly, for a need more desperate than anyone expected. The AAA wartime program promotes highly selective cropping through cooperation with millions of farmers who devote each of their acres to the best war service it can render, not merely with immediate increases in view but for the full duration of the war.

MANY ACTIVITIES COORDINATED

Phases of the program are cogs that mesh and synchronize and keep the whole in balance. Acreage allotments harmonize with production goals and guide the planting of each crop. Marketing quotas limit the marketing of crops for which the demand is not sufficient

either because we have large supplies on hand or because they are not vitally needed in the war effort. Soil-building practices raise output now and build soil resources for the future. The Ever-Normal Granary provides a feed reserve for producing needed meats, dairy products, and poultry products.

This year's output of the high-vitamin foods would have been greatly hampered had farmers been obliged to rely entirely on currently produced feed. During the fiscal year 1942 approximately 150 million bushels of corn were withdrawn from the Ever-Normal Granary for immediate use; in the second half of the fiscal year 36 million bushels of wheat were taken out of Commodity Credit reserves for livestock feeding. The backbone of the Ever-Normal Granary is the commodity storage and loan program which local AAA committees help to administer.

The AAA program provides agricultural conservation payments for farmers who comply with acreage allotments and carry out designated soil-building practices. There are parity payments besides to bridge the gap between loan rates or market prices plus ACP payments and parity. These are made on crops such as wheat, corn, and some types of cigar tobacco, for which the demand has not been great enough, in view of the large supplies on hand, to bring the farmer's price up to parity.

Fully mobilized when we became involved in war, the AAA program proved readily adaptable to the new requirements; it had been set up on a plane of ample production while we were still at peace.

The production goal idea, which had been used already for major crops, served well for all agricultural commodities in a pattern established first for the Nation as a whole and then worked out on a State and county basis. Local AAA committees applied the goals on an individual-farm basis. This meant the adoption, farm by farm, of an "intentions to perform" blueprint, on a plan used in modified form by the AAA in previous years.

The corresponding blueprint for 1943 will define still more specifically what each farm should produce. It will look toward a definite commitment on the part of each cooperating farmer to meet his goals. AAA payments will be conditioned upon fulfillment of the individual farm responsibilities.

County and local farmer committees are the administrative bedrock of the program. They canvass the farms individually for sign-ups in the goals work. These committees help also to bring the Department and other Federal agencies into touch with farmers for other war campaigns. Facilities of the AAA county and local committeemen, whose membership with the alternates exceeds 150,000, are available to USDA State and County War Boards, which are headed by State and county AAA commitee chairmen and have responsibility for giving unity and cohesion to the agricultural war effort.

PRODUCTION THROUGH CONSERVATION

More production through conservation was a main objective in 1942. The AAA program provided specifically that cooperating farmers should devote a portion of their cropland to soil-conserving crops

or practices. Experience had shown that conservation is a means of obtaining greater production now.

To stimulate the production of oil crops where goals for these crops were hard to reach, the AAA included soybeans and castor-bean seed among the conservation materials furnished in lieu of AAA payments. This procedure applied to limited areas of the South and Southwest. In addition, the program provided for full payment on peanut-acreage allotments only if at least 80 percent of the allotment had been planted. A similar provision applied to potatoes. Moreover, potato growers could exceed their potato allotments by 10 percent without incurring deductions from AAA payments. Especially urgent was the need for more rice. Therefore the program provided that growers should incur deductions at 10 times the payment rate for failure to plant their full rice allotments and conversely should incur no penalty for overplanting rice. Another AAA program amendment permitted maximum use of volunteer wheat acreage.

Various changes in the program encouraged needed expansion in the production of milk, eggs, and other protective foods, and in other war crops. Allotments for special crops continued to prevent undue waste of soil and labor needed for the most critical products. Also the AAA encouraged farm families to grow more of the things they eat, so as to release for use elsewhere some of the food they normally buy. Approximately 630,000 farm families earned the farm garden payments in 1941 and a greater number as yet uncounted in 1942. This garden movement tended to raise the nutritional standard among farm families. Contrary to common belief, farm families are not always well fed.

Features of the AAA program included acreage allotments applicable to cotton, peanuts (other than those used for oil), potatoes, rice, tobacco, wheat, and corn in the commercial corn area. In many cases these allotments indicated a minimum as well as a maximum desired acreage. Marketing quotas were in effect for cotton, wheat, peanuts (for the edible trade), flue-cured, burley, fire-cured, and dark air-cured tobacco.

The number of farmer participants in the 1941 agricultural conservation program was about 6 million, and the cropland included was a new high of 371,278,000 acres, or more than 81 percent of the country's entire crop acreage. Figures on the 1942 participation are not yet available, but they will probably show an equal or larger number of cooperating farmers.

Farmers who participated in the 1941 program seeded legumes and grasses on 42,957,434 acres and grew green-manure and cover crops on 19,516,296 acres. They applied 13,530,499 tons of limestone, and 1,136,767 tons of 16-percent superphosphate or equivalent; reseeded 28,342,999 acres of pasture and range land; practiced contouring on 8,150,000 acres and strip cropping on 6,194,000 acres; planted 145,121 acres of trees; constructed 45,732 miles of terraces on more than a million acres; and built 54,868 dams and reservoirs. In total agricultural conservation payments they earned $456,454,000; and received parity payments on wheat, cotton, corn, rice, and tobacco which totaled $196,908,000. Comparable figures for 1942 have not yet been compiled.

TWO MAJOR PARTS IN AAA PROGRAM

The AAA program for 1943 has two major parts—production adjustment and production practices. Under the head of production adjustment it provides for a production-adjustment allowance for each cooperating farm, obtainable for compliance with acreage allotments and fulfillment of war-crop goals. Full compliance is contingent upon planting within the special crop allotment but not less than 90 percent of such allotment, except that acreage of war crops may be substituted acre for acre for other allotment crops; and planting at least 90 percent of war-crop goals. Thus the production-adjustment payment is definitely a payment for producing for war needs.

The production-practice allowance may be earned by carrying out those conservation practices which are needed most on the farm for war production and which would not be carried out in sufficient volume without payments. Also the 1943 program will put more responsibility on local committeemen.

Aerial photographs taken by the AAA as an economical and accurate method of checking program performance are being used extensively by the military forces and other Federal agencies. This vitally important photography, had it not been on hand already, would have been unobtainable at any cost for certain urgent military projects, because only during infrequent spells of clear weather can high-quality aerial photographs be obtained.

USDA War Boards

The USDA War Boards, established in July 1941, became in 1942 the shock troops of agriculture's Food for Freedom program.

Composed of field representatives of each Department agency with war responsibilities, the boards in the States and counties are headed by a chairman, who is the AAA chairman for that State or county. They provide over-all guidance and coordination of the farm war effort, carry out projects assigned by the Secretary of Agriculture which call for a Department-wide approach, and act for the Department in cooperating with local offices of war agencies, such as the War Production Board, the Office of Civilian Defense, Office of Defense Transportation, and Selective Service. The chief of the Agricultural Adjustment Agency is Special War Board Assistant to the Secretary.

In Washington the Secretary is assisted in formulating departmental wartime policy by the USDA War Board and the War Board Advisory Committee. The Washington board consists of 11 chiefs from Department of Agriculture agencies whose programs are an integral part of the war production program. The advisory committee consists of officials from Department bureaus represented on State War Boards and of other officials with a special interest in the work of the Boards. It acts in a preliminary and a follow-up capacity. The Office for Agricultural War Relations serves as liaison between the Department of Agriculture and other governmental war agencies at the national level. War Boards apply national crop-production goals to individual States and counties.

As a basis for determining allocations of steel and other material for particular types of equipment, State and County War Boards conducted a survey of available farm machinery and of prospective needs, and followed the survey with a farm machinery repair program. Until mid-September, when rationing of farm machinery was announced, growers generally needed no preference ratings to get farm machinery and equipment except for certain heavy equipment, such as crawler-type tractors which had been taken over for military and defense construction. However, production quotas limited the number of implements turned out, and purchase requests exceeded the total which could be supplied.

Surveys by War Boards indicated a widespread lack of bale ties, fence wire and posts, poultry netting, welding rods and electrodes, and also furnished information on which the Department could base requests for allocations of scarce materials. At the request of some manufacturers of specially needed machinery such as rice binders, War Boards allocated the equipment so that it might reach those farms where it would contribute most to the Food for Freedom goals. The Boards encouraged the early marketing of hogs and handled the cer-

tification of canners of peas and tomatoes in line with the requirement that such canners, if they wish to sell their products to the Department, must contract to pay growers at least the minimum fair price in their locality.

The Boards encouraged greater use of high-analysis fertilizer, larger acreages of legumes, and increased production and conservation of seeds such as soybean, hemp, flax, and peanut. They supplied dealers with information on the requirements of new applicants for nitrate of soda, certified farmers to the Bureau of Mines for licenses to acquire sodium chlorate, widely used as a weed killer, surveyed the long-staple cottonseed supply, and publicized the results. Information on how to control cotton insect pests most effectively with the limited supplies of calcium arsenate obtainable reached farmers through the War Boards.

INVESTIGATIONS LEAD TO COOPERATIVE ACTION

In cooperation with the United States Employment Service, War Boards investigated farm labor requirements and the possibility of sharing workers among farmers; they pointed out spots where shortages were serious and enlisted the help of students, women, and businessmen. In Idaho, for instance, War Boards and others brought a critical situation to the attention of the Governor, who proclaimed a week's "holiday"; highway maintenance work was suspended so that State employees could help save the beet crop. In many sections, school buses were procured to transport laborers to and from the fields. At the request of Selective Service officials, War Boards furnished information to local Selective Service Boards on the question of deferring essential workers.

At the request of farmers, the transportation of farm workers from other States was arranged by the Farm Security Administration, and Mexicans were permitted to migrate temporarily into the United States for farm work. After simplified procedures of transfer were developed, Japanese évacués were successfully recruited from relocation centers; War Boards assisted in arranging meetings to discuss and work out ways of providing guarantees of adequate protection, transportation, and housing facilities for these workers.

Normally agriculture takes 60 percent of all textile bags, half of them made of burlap, which is now requisitioned for sandbags and other purposes. Grain and feed stores, bag dealers, and elevators cooperated with the Boards in establishing bag exchanges in many counties, so that bags and other containers could be used again and again. The Boards obtained vocational school cooperation in building and reconditioning egg crates and other box containers.

War Boards considered the use of empty garages and stores to supplement insufficient terminal and farm storage, and the moving of surplus stocks to sections where seasonal crops had already been marketed. Some Boards acted as clearinghouses, and maintained lists of available storage for the convenience of building owners and farmers. They also determined the number of steel and prefabricated bins to be shipped to States where crop production outstripped storage facilities.

In April a conservation order stopped all but absolutely essential building. Soon afterward the Nation's lumber supply was frozen in the hands of dealers under an order later slightly modified. County and State War Boards examined all farm applications for construction and certified to the War Production Board those judged necessary for the successful prosecution of the war. By areas and dealers, they apportioned nails earmarked for farm construction.

War Boards acted in an advisory capacity to farmers and to the Office of Defense Transportation in allocating commercial farm vehicles. The rationing of tires and tubes, of transportation, and of gasoline in some parts of the country brought further transportation difficulties. Growers were encouraged to conserve their trucks and tires, to eliminate unnecessary trips, to pool loads and trucks, and to plan necessary hauling. In Harrison County, Miss., for instance, the War Board took the lead in organizing the retail delivery of fluid milk on a pooling basis that saved about 100 miles a day and eliminated 3 daily trips to town. In Perry County, Ark., War Boards enlisted the cooperation of truck owners in hauling for all the people in the community when making a trip to town. This practice saved about 20,000 miles of hauling a week.

Farms have been acquired for camps, munitions plants, firing ranges, airports. The War Boards have been of help to displaced farm families in finding new farms and in adjusting their damage claims.

Campaigns to move scrap iron, rubber, and other vitally needed materials off the farms and into salvage channels have been important War Board activities. About 2 million tons of scrap iron was moved through War Board efforts. In towns of less than 15,000 population and in rural areas, the Boards made surveys to locate auto graveyards. Other War Board duties included: Location for the United States Army Signal Corps of unused farm generating plants; collaboration in spreading essential war manufacture to all plants—small and large; cooperation with the Office of Civilian Defense in the prevention and fighting of forest and other fires; cooperation with the Treasury Department war-bond drives.

Extension Services Along the Farm War Front

Extension education emphasized adjustment to war needs throughout the whole range of farm work from plowing and seeding to marketing. It dealt also with production for use on the farm, with price relationships and inflation control, with transportation problems, with the collection of scrap metal and rubber, with the care of clothing, with nutrition and health, with fire prevention, with the care of farm machinery, and with scores of other matters. Outstanding among the extension assignments were the training of more farm people as rural leaders, and the more intensive use of farm and home demonstrations as a means of quickening the agricultural response to the war call. These procedures, though not new in extension practice, took on new importance, because lack of transportation interfered with educational meetings.

The system of volunteer local leadership expanded to include more than 800,000 neighborhood leaders—1 man and 1 woman leader for each 10 to 15 families. Elected in many cases by their neighbors, these leaders received special training. County agricultural and home demonstration agents provided them with current wartime information and special instructions from time to time. Small "walk-in" meetings, telephone calls, personal visits, over-the-fence chats, and other neighborly means enabled the local leaders to reach practically every farm family. In North Carolina, for example, neighborhood leaders discussed the dangers of inflation and the program to check it with 85 percent of their farm families within a single week. Activities of the neighborhood leaders reflected requirements of this Department, of the State War Boards, of the State and county councils of defense, and of other Federal, State, and local agencies.

The main job was to explain the Food for Freedom program and help the farmers to carry it out with the best available techniques. Thousands of farmers who had never grown peanuts and soybeans commercially learned how through demonstrations, personal visits, and extension publications. Other extension programs aided farmers to produce more milk per cow, more eggs per hen, and more meat per animal. Long-established home food production programs received extra attention, as mentioned in the section of this report which deals with the Victory-garden movement.

Teamwork brought results in a campaign to explain the farm-machinery situation and get farm people to buy repair parts immediately; also to take the best possible care of their equipment. Representatives of public agencies and machinery manufacturers, after a national conference in Chicago, launched a vigorous Buy Repair Parts Now campaign.

Winter sales of farm machinery repair parts up to March 31 were considerably greater than in the previous winter. Dealers estimated

that 40 percent of all the repair parts likely to be sold in 1942 had been sold before the spring. Farmers reconditioned many machines which ordinarily they would have replaced. Later reports indicated the amount of repair work done was sufficient to offset the lack of new equipment.

Many problems in marketing and distribution came to light in the Food for Freedom program. In the South, for example, the response to the call for more eggs clogged distribution channels. The Department supported egg prices, and extension agents showed farmers how to adapt their marketing methods to the emergency. These methods included maintenance of egg quality, assembling of eggs in 10-case lots, and holding eggs in cold storage for shipment as facilities became available.

MANY-SIDED EXTENSION PROGRAM

The Extension Service helped dairy cooperatives meet quality and grade requirements for cheese for lend-lease shipment. It helped processors and farmers to expand the output and movement of milk products. Transportation problems, which developed with increased farm production, suggested the organization of cooperative trucking associations to save tires. Educational programs on speeding the feeding of hogs and livestock to full weight helped to extend the marketing season and reduce peak loads. Merchandising programs with fruit and vegetable growers and with consumers encouraged a quicker movement of peak supplies. Technical services to sheep producers aided the production of quality shearlings. Other Extension activities dealt with substitutes for wrapping shipments of wool; and with the return and re-use of used containers such as egg cases, wrappings, and boxes.

Simultaneously the seven-point cost of living program and the reasons for it received Nation-wide attention. Educational programs showed how farmers could cooperate to check inflation, and warned them they would be losers eventually should inflation develop. Officials conferred with OPA representatives, gathered subject matter, and distributed it through regional meetings and in other ways. Neighborhood leaders began to explain the cost of living program early in July, and referred constantly to it thereafter. In most States they left a check sheet with farm families to guide them in doing their part, and kept them currently supplied with information on price controls and rationing. Surveys showed growing awareness among the farmers that the anti-inflation front must be held.

Other matters covered in the programs included cooperative hauling; cooperative full carlot shipments; land use planning for immediate and prospective needs; the prudent use of credit; the importance of avoiding land speculation; the dangers of entering the post-war period with excessive farm debt; collection of scrap metal, rubber, bags, paper, and waste fats; and increased farm production of wood for fuel. In large fuel-wood-using regions, notably the South, New England, and the Pacific coast, this was a major extension education job, especially useful in its power to reduce the need for transporting other fuels. The cotton quality movement received attention with emphasis on handling the longer staples so as to preserve their value.

Especially important was the role of the Extension Service in the coordinated wartime nutrition work of the Office of Defense Health and Welfare Service. The Director of the Extension Service has charge of this work. Extension agents emphasized the importance of the production and preservation of home food supplies on the farms. In rural education work they explained the importance of "enriched" bread and flour, the necessity for fresh fruits and vegetables in the diet, and ways of cooking foods to save their vitamin content. Farm as well as city families have to readjust their eating habits in the war emergency. The Extension programs explained the reasons for this necessary readjustment, and aided farm people to effectuate it. So as to assist farm people in other wartime adjustments, home demonstration workers took home-nursing and first-aid courses and gave instruction to the volunteer neighborhood leaders in emergency first aid and other care of patients.

Care of clothing took on increased importance. The Extension Service organized clothing clinics and demonstrations, and provided farm housewives with technical information on the remodeling and renovation of apparel and on the proper selection of clothing in wartime. Wartime rural clothing problems were the topic at regional extension conferences. These were the prelude to the clothing educational program, which dealt with current and prospective clothing needs, with the use of substitutes for scarce clothing materials, and with the conservation of clothing. The campaign included attention to the care and maintenance of sewing machines in thousands of farm homes. Through home work in making, mending, and remodeling clothes, farm people can save an estimated 4 million dollars annually. Slogans are: Waste Nothing; Buy Carefully; Take Good Care of All Clothing on Hand.

In the rural program against destructive fires, the Extension Service emphasized four broad objectives: (1) Surveys of rural fire hazards, (2) means of identifying and eliminating them, (3) organization of fire-fighting crews, and (4) making inventories of rural fire-fighting equipment and providing for their maintenance and efficient use. This program is part of a larger emergency fire-fighting program which the Office of Civilian Defense has launched and which includes cities and towns. Considerable progress has been made in it already. For example, California has organized 2,200 rural fire-fighting companies and trained more than 23,000 volunteer rural fire fighters. The program calls for the organization and training of fire-fighting crews of 10 to 20 volunteers in every rural community.

THE 4–H CLUBS

As in previous years, the rural boys' and girls' 4–H Clubs have taken an important part in extension activities. In rural counties all over the country 4–H Club members have joined in the Food for Freedom program. They have planted Victory gardens; raised hogs, dairy cattle, beef cattle, and poultry; canned many million jars of fruits, vegetables, and meats; and preserved much fruit through drying, brining, and storing. They have been influential in the better prepa-

ration of family meals, in the skillful utilization of dairy products in farm homes, and in promoting the use of vegetables often previously lacking in farm family diets.

Trained through their project work in the use of tractors, milking machines, and other farm machinery, thousands of 4–H Club members have helped to meet the farm labor shortage. They have bought war bonds and stamps and urged others to buy them. They have cooperated with salvage committees in collecting aluminum, rubber, paper, and scrap metal, served as air raid wardens or aircraft spotters, organized 4–H fire fighters, learned how to put out incendiary bombs, and in some sections helped to prepare their homes for receiving possible evacuees. The 4–H Club work, like the Extension program generally, has included first-aid study, home nursing, home sanitation, and farm and home safety activities.

How the War Is Changing Our Farming Systems

War is swiftly reshaping the map of American agriculture. Some of the changes thus induced are likely to prove even more sweeping and lasting than the widespread adjustments that took place during and after World War I. That war marked the end of a long period of agricultural expansion during which American farmers produced large export surpluses of cotton, wheat, tobacco, pork, lard, and other commodities. The post-war period required reduced production for export.

After 1933, the adjustment process was speeded up by more direct Government programs for agricultural production and marketing. Farmers succeeded also in substituting soil-conserving practices for methods that were seriously endangering soil resources.

Technology advanced rapidly. Advances in mechanical power and equipment applied to farming and plant and animal science produced startling practical results. Hybrid corn swept the Corn Belt and stepped up average corn yields. Alfalfa and other legumes raised hay and forage yields. A practically unknown crop, soybeans, came over the farm horizon. Significant progress in breeding and feeding livestock began to get results.

Then came World War II. At first the war seemed far away and the only immediate effect was a further curtailment of an already reduced foreign market. But soon came lend-lease and, in December 1941, our own direct participation. Now in 1942 we are living in a different world. We are fighting in a total war and we have become a principal source of food supply for the United Kingdom, as well as others of the United Nations. Our own military forces require tremendous quantities of foodstuffs.

Once again we have a vast export market. At the same time we are cut off by enemy occupation from important sources of certain food imports. Shipping difficulties have further complicated the whole world scene so that some friendly areas are only partly accessible. Nearby stocks of sugar, for example, are difficult to transport to the continental market.

The shipping situation, moreover, places a high premium on space, and consequently the increased export market demand is not general but highly selective. Only the most concentrated foods can be sent overseas to our allies and our armed forces. Even a relatively compact food such as evaported milk, which was high on the early lend-lease list, has been replaced in part in 1942 by still more concentrated dry skim milk and dry whole milk. Lard, pork, dried eggs, and dehydrated fruits and vegetables are other compact foods that are needed.

Everyone is familiar with the place in the Nation's agricultural map of such regional terms as Corn Belt and Cotton Belt. We must now be prepared to welcome some newcomers to the scene. Soybeans have become a major crop and we may need to refer to the Soybean Belt. Similarly, the rapidly expanding Peanut Belt in the South Atlantic States may deserve to be called by that name.

New egg-drying plants in the Mississippi Valley might suggest another descriptive term for a long curved band extending west from Ohio through Iowa and down through Texas. These plants had an annual drying capacity of 300 million pounds of dried eggs by June 1942, or six times the Nation's capacity a year earlier.

Expansion of these products is resulting in some shifts in crop acreages, although part of the increase is coming from land that has remained idle in most years. Increases in the acreage of soybeans in the Midwest have been accompanied by reductions in the acreage of corn and small grains, particularly oats. More recently even hay land has been shifted to soybeans.

The possibilities of expanding other crops in the South have been increased during recent years by the marked reduction in cotton acreage. The cotton acreage harvested in 1941 was only a little more than half that in 1930. Land for soybeans and peanuts in the South, too, has come partly from corn and other crops.

Feed for the greater numbers of milk cows and other types of livestock in the South has come mainly from increases in the acreage of hay and small grains and in some areas from improved pastures. The wartime necessity for rather general increases in the acreage of most crops means that less land will remain fallow and that such practices as double cropping will increase.

LONG-TIME CHANGES

With improved moisture conditions and the strong war demand for livestock products, farm adjustments in many areas of the Great Plains and Pacific Northwest have been moving in the direction of long-time desirable changes. Cropping systems are shifting toward feed crops. In some areas this means more corn, barley, and oats, in addition to roughage. In other areas wheat produces more pounds of livestock feed per acre than alternative grains. Increasing the flexibility of the Ever-Normal Granary will assist farmers in these areas to develop a desirable and permanent livestock industry.

The wartime shift of consumers from one region to another disrupts supply and demand relationships, especially for perishable farm products. Fluid milk needs in the vicinity of rapidly expanding industrial centers are difficult to supply, as Pacific coast and southern dairymen particularly have been finding out. At the same time other milksheds from which consumers have been drawn away may have temporary local surpluses that create special problems. The "Okies" have settled down for the duration to work in airplane and munition plants, and farmers who have depended on migrant labor have difficulty in getting help. Thousands of underprivileged rural people in the southern Appalachians and the Southern States generally are being drawn into

city employment. This time they are finding it closer to home than in World War I. Instead of moving to northern cities, they get jobs in southern industrial plants.

The war tends to stimulate technological advance in agriculture. Some of it will come during the war and some not until afterward. Farm machinery will be increasingly substituted for unavailable labor. Although supplies of new machinery may be restricted during the war because of priorities for war material, the existing stocks of farm equipment will be used more intensively.

In earlier periods the increased adoption of machinery tended to enlarge the farm plants. Recent developments have been somewhat different. Farm electric power, small tractors, and corollary equipment do not point so much in the direction of larger farms as toward more balanced family farms, with less dependence on hired labor. In many areas time released from field operations can be most profitably used in expanding livestock operations.

Processing facilities are lacking in some areas where other aids to production are more adequate. The shortages of critical materials for constructing new processing facilities will also channel much of the increased output of products that require such equipment into areas where the production of these items has been established for some time. In some instances existing processing facilities may be transferred to new uses. The use of cottonseed crushers to extract oil from soybeans is one example.

WHEN PEACE COMES

When the peace finally comes agriculture will be vastly expanded, especially in the production of concentrated foods. Will the great war market collapse at the moment when the last guns cease firing and the last plane has dropped its bombs? This did not happen before and it is less likely to happen this time. For several years the demands of peace will be as great as, if not greater than, those of the war itself.

This country will probably have to furnish a large part of the food supply for the Axis-occupied countries and for the enemy nations as well. Devastation is much greater this time than in 1918 and the areas involved are far more extensive. The Far East and northern Africa too will need extensive assistance that was not required at the close of World War I. This time no continent has remained untouched.

After the post-war relief problem is cared for we may need to look forward to some radical changes in farm production. The total volume of production is not likely to be too great, but its make-up, in terms of the types of food and fiber needed to supply our domestic market plus whatever export market we may retain, will be badly out of balance.

In areas that are growing critical commodities for the first time, new farm machinery is needed badly. It is needed also in areas which are making outstanding increases of crops that require special equipment. Stepped-up production rates throughout the country increase the need for repairs and replacement parts. These often

require scarce materials such as copper, brass, high-grade steels, and lead. The quantity of new machinery available for 1943 will be only about 20 percent of the average for 1940 and 1941. Repair parts for farm machinery, however, will be available in about the same quantities as in 1942. There is a brighter side of the machinery picture. Farmers have built up their inventories of machines and equipment in recent years. No other large nation has an agriculture so completely mechanized and so well equipped. But the more complete the mechanization, the greater the need for repairs and replacements. Some new machinery, replacement parts, tires, and adapted new equipment will be indispensable. We cannot turn to manpower or even animal power. It is not available.

Outstanding are the needs for peanut pickers and combines to harvest peanuts and soybeans. Some areas have more flexibility than others; they can shift, for example, from wheat to flax, or from oats to soybeans, and use largely the same machines. Tillage equipment is in demand, although the shortage is not yet acute. More multirow equipment would come in handy to offset reductions in the number of workers.

Other machines needed include beet drills, milking machines, pick-up hay balers, and side-delivery rakes. Fencing materials are scarce. Quite important is the need for track-laying tractors in western irrigated areas, on steep dry-land units, and in rice fields. In such areas much of the harvest and tillage equipment used requires track-laying tractors. Woods operations will be seriously handicapped without replacements for "cats" and other heavy equipment. Lumber trucks and tires will be scarce in 1943.

Fertilizer and certain farm supplies will be scarcer than usual in all parts of the country. Shortages of fertilizer, spray materials, roofing, and the like may seriously handicap certain types of production over a period of 2 or 3 years.

The East and South depend heavily on commercial fertilizer. Nitrates particularly are short for immediate application. Shortages of nitrate of soda in the South may indirectly affect the acreage which can be devoted to soybeans and peanuts, because a shortage of soda will undoubtedly cut corn yields and increase the acreage required to produce a given amount of feed. It will thus be more difficult to increase acreages of peanuts and soybeans for oil.

Rotenone, arsenicals, and other effective insecticides and fungicides will be scarcer. Substitute materials may be used to some extent, but wherever possible needs should be reduced by the adoption of effective farm practices. The use of treated seed and of early maturing and resistant varieties of many crops, can reduce damage from rust, smut, weevils, and blight. These methods, however, have limitations. Careful allocation of the scarce insecticides and fungicides is necessary as well.

Wartime pork and lard production will need to be contracted severely. Probably soybean- and peanut-oil production will be considerably in excess of domestic requirements unless we propose to shut out tropical oils permanently. Sugar-beet production will surely be at too high a level at the end of the war.

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If nutritional needs are to guide us, we are not likely to have enough milk and dairy products, eggs, or green and leafy vegetables to supply our own population. These considerations suggest the direction in which our post-war pattern of farming should be guided. With increased farm efficiency and opportunities for urban employment we shall not need as many farmers. The type of farm production will shift away from some of the war products toward the production needed to supply our own population with a balanced diet.

Farm Production Capacity

Complicated by the shifting pattern of needed materials and machines, of crop and livestock practices, and of interdependence between livestock and grain areas, agriculture's task is essentially one of getting integrated results from widely scattered farm resources.

What, from the farmer's standpoint, is the job? Officials of this Department worked with other agencies of the Government to find out more precisely—with the War and Navy Departments, with the War Production Board, and many other agencies. How much milk do we need? How many hogs? How much feed? How much of everything produced on the farms do we need for our armed forces, our allies, and our civilians, for industrial needs, and for reserves?

Next, what means have we of doing the job? Farmers, State agricultural workers, and Departmental specialists have been examining each type of farm to learn what production could reasonably be expected from the soil, buildings, and equipment—and what reserve power could be mobilized if necessary. The inquiry covered hundreds of typical farm situations throughout the country. It developed estimates of the productive capacity of each type of farming area, of each State, and of the country as a whole—an inventory of our farm machine.

The third and final step is a continuous one—gearing farm production to the national needs and keeping it moving. It involves a breakdown of national needs into a feasible job for every farmer. This is the purpose of the production goals plan. Each farmer can learn from it how to fit his own farm into the national effort.

In 1942 farmers met many needs by expanding the agricultural plant and intensifying their cultivation of it. They plowed idle land, put pasture and hay land into crops, and shifted some cropland to new crops such as peanuts, soybeans, flax, long-staple cotton, heavier producing feed crops, and hay. They increased total production over the high levels of 1941. In general, the increases of 1942 did not further endanger our soil, or reach the ultimate limits of our physical capacity to produce. They did not fully employ our technology. Weather, however, was unusually favorable. Greater efforts may be needed to obtain as much production in 1943, even if the agricultural plant is slightly larger.

Some further increase in the production of vital war commodities, and even of total production, is feasible. True, the labor supply on farms is getting smaller and is less skilled. More effective placement and utilization of it, however, will make the available supply go further. Scarcity of new machinery and shortage of other supplies are limiting factors. Transportation and processing problems will be numerous. Yet we have reserve productive capacity, and some of it, but not all, we can expect to realize in actual output.

OUR LAND RESOURCES

In the use of available cropland we have about reached the upper limit except in the Great Plains. Favorable weather there may allow some increases in intertilled crops and small grains. Total production, nevertheless, can become greater through increased farm efficiency, the use of more intensive crops, and the planting of crops on the land best suited to them. Production of any one commodity can be increased either by growing it more efficiently or by reducing the production of other commodities. More soybeans may mean less corn or oat acreage; more peanuts, less cotton; more flax, less wheat; more pork, less milk or eggs. Chances to make shifts of this kind, however, will be contingent also on marketing facilities.

Some farms can increase or maintain their total production by using more manures and other fertilizers, by adopting improved varieties of crops, by giving better care and feed to livestock, by organizing improved farming systems, by feeding hogs to heavier weights, by practicing better livestock sanitation, and by taking more advantage of recent technological improvements. Many farmers are making plans to do these things. Others will do so with educational and other assistance. Thousands of small farmers will be assisted through loan programs that provide stock, equipment, and feed.

Farmers cannot count with assurance on yields as high as those of 1942. Flexibility exists, however, for increasing individual crop products. Estimates indicate that it is feasible to plant 1 million more acres of soybeans, an increase of 10 percent; 1 million more acres of peanuts, an increase of 20 percent; and 150,000 more acres of flax, an increase of 3 percent. Farmers can plant 250,000 more acres of long-staple cotton. They can have 800,000 more sows farrowed in the spring of 1943 than in 1942, they can milk more than 500,000 additional cows, and collect 250 million more dozens of eggs. Record numbers of livestock, especially hogs, can be fed from the 1942 bumper crops of feed.

MACHINERY AND OTHER FACILITIES

Machinery, fertilizers, and other materials of production, however, are less plentiful. Especially significant is the reduced supply of skilled farm workers. Rubber and insecticides will be scarce; they used to come largely from territory now in the hands of the enemy. Steel must go into munitions production; nitrates are basic to gunpowder; our armed forces and war industries must have manpower. Transportation feels the shortages of metals, gas, lubricants, and labor. Farmers will do their job and do it well, however, in spite of these handicaps. They will extend their already long working hours on farms, and use the labor of women and farm youth.

Hazard of Land Speculation

The rise and collapse of land values during and after the first World War was responsible for much of the agricultural distress that subsequently developed. Among the consequences were widespread loss of ownership of mortgaged farms, and reduced levels of living among farm families who attempted to hold excessively mortgaged farms. Many farmers and others fear a possible repetition of this pattern of events.

So far, developments in the land market have not been alarming. But latent forces are tending to stimulate value increases, and they give rise to apprehension. Both land values and sales activity increased markedly between March 1, 1941, and March 1, 1942. The Department's index of the average value per acre of farm land (1912–14=100) for March 1, 1942, was 91, as compared with 85 a year earlier, 84 on March 1, 1940, and the low of 73 on March 1, 1933.

The advance during the year represents an increase of 7 percent over the previous year. This is a rise of almost double the size of annual increases that occurred after the depression; it is the largest reported since World War I. In the 4-month period, March 1 to July 1, 1942, a leveling-off in values and also in the volume of transfers occurred. In mid-1942 values were 25 percent above the 1933 low, although still 9 percent below the 1912–14 base and almost 50 percent under the 1920 peak.

The seriousness of the problem is to be gaged, however, from the forces that are operating in the market and from their probable imminent effects, rather than from the value increases that have occurred already. Forces that tend to stimulate value increases are active. They include high farm prices and incomes, and favorable income prospects. These factors are a strong inducement to land buying by farmers and others. Credit conditions and other financing arrangements are generally favorable for purchasers of farms. The appraisal policy of the Farm Credit Administration and of a number of private lending agencies is conservative, but competition among mortgage lenders is active in many areas. Current land-value levels generally are considered warranted; some optimism, tempered by fears of a later collapse, exists with respect to the course of land values during the war. The supply of lands available at present prices has declined, and asking prices have strengthened.

Various factors tend to inhibit increases in farm-land values, such as price ceilings and other price controls, shortages of farm labor, rising farm wages, shortages of equipment and productive livestock, and difficulties in processing, storage, and transportation. Farmers are using part of their increased incomes to pay their debts and to buy war bonds. They face heavier income taxes and possibly other taxes.

Recollections of the last post-war slump temper optimism with regard to farm-land values.

These deterrent influences, however, appear to be somewhat overshadowed by the stimulating influences, which may become dominant if prices continue to advance, and if a large pool of excess purchasing power remains unabsorbed by taxes or war bonds. Excess buying power would exert a steady pressure toward a higher level of land prices as well as toward a higher level of prices in general. It would directly stimulate investment in land. In fact, many of the influences now at work in the land market come from the greatly increased fund of excess purchasing power which is seeking outlets. In short, the land market has inflationary potentialities.

POSSIBLE CURBS ON LAND MARKET

Programs to curb inflation generally will have a bearing on the land market. Efforts to limit price and wage increases, and to absorb excess purchasing power through taxation, war-bond purchases, and debt retirement, will be the most important. Yet specific controls in the land market might be necessary even if the general anti-inflationary programs, with farm commodity price controls included, were reasonably successful. The purpose would be to avert post-war impacts of declines in land values.

Voluntary measures, such as conservative lending by financial agencies, and educational efforts, can help; but we cannot rely exclusively on such means of curbing value-stimulating influences. It may be necessary to consider stronger measures. Methods proposed for controlling the farm real estate market may be classified broadly into four major groups: Credit controls; taxes; land-price ceiling regulations; and direct control of the transfer privilege. Specific proposals could embrace two or more of these approaches.

Most of the distress associated with big changes in land values results from rigid obligations assumed at land-value levels which are high in relation to long-time farm earning power. Credit controls would serve to prevent or minimize the ensuing loss of equities. Other purposes of such controls would include the curbing of land-value increases, and the discouragement of land speculation. These purposes might be promoted through the establishment of levels beyond which mortgage credit for individual farms could not be expanded for the duration of the emergency. Such credit policies would limit the extent to which high wartime price and income levels could be reflected in appraised farm values and in fixed contractual obligations.

Tax measures that might be used for controlling the farm real estate market to some extent in the emergency period include taxes on land transfers, resale gains or war-increment taxes, taxes on rents, and taxes on mortgages. The most appropriate of these measures appear to be the capital or resale-gains type of tax and the transfer tax. The principal purpose of a resale-gains tax would be to minimize buying for reselling at a profit; in other words, to eliminate or discourage speculation. Presumably, land purchases for investment or

operation would not be influenced adversely. Yet increases over levels likely to prevail in the post-war period could occur under the steady pressure of purchases for investment and operation, and might call for other regulatory action.

Establishment of price ceilings for agricultural land would constitute a general type of control, similar to the control now exercised over many commodities and over rents in defense areas. Ceilings or maximum prices at which agricultural land could be transferred would be established on the basis of an appraisal as of a selected base date. The primary purpose would be to minimize the influence of wartime prices and incomes on the sale price of land. Appraisal methods such as those used by the Farm Credit Administration, or those recommended by the American Society of Farm Managers and Rural Appraisers, would probably be satisfactory.

Proposed credit or tax measures might be designed to invoke a "handicap" type of discrimination among classes of land buyers. There is the possibility also of direct discrimination on a type-of-buyer basis. Either priorities or the direct prohibition of purchases by certain buyers could be employed. Such a measure would chiefly involve discrimination against nonfarmers, and a principal purpose of it would be to prevent a drastic change in the farm-ownership pattern. The total procedure for controlling the land market might involve resort to these types of measures in the following order: (1) Educational and informal voluntary measures; (2) credit controls; (3) tax measures; and (4) a comprehensive permit system for price and type-of-buyer control.

INSURANCE ASPECT OF LAND VALUE MEASURES

Concern over wartime increases in land values and in mortgage debts assumes that land prices will fall after the war. But such a post-war price crash is not inevitable. National monetary and fiscal policy may be successful, particularly if further price advances are moderate, in maintaining prices after the war at levels near those that now prevail. In that event the current higher levels of farm-land values would be maintained and the danger of a slump would be greatly lessened. But we must bear in mind the fact that the methods available for stabilizing the general price level have not yet proved their effectiveness.

Measures for controlling land values during the emergency period have consequently an insurance aspect. Taking no formal action means taking a gamble. In favor of the insurance principle, it is important to note that an adjustment from controlled lower levels to permanently higher post-war levels would be far less disruptive than an adjustment downward from uncontrolled inflated values. The safer course is to discourage or slow down value, credit, and ownership developments, until we have a better basis for predicting price and income levels.

Suppose, however, we do not discourage a major upswing in farm-land values, and a slump develops when the war ends. What then? Measures of the type used during the 1930's will be available. They

will include debt-adjustment programs, moratoria of various types, and subsidized credit, production, and income programs. Such programs may have to be used in dealing with post-war problems. They may be limited, however, to alleviating distress in the more acute cases. Even so they will be costly. Preventive action now can reduce this future liability. It can head off bad situations, and deter irresponsibles from making risky commitments in the belief that if trouble comes the Government will bail them out.

Moreover, Federal programs to achieve maximum production for war needs, to rehabilitate low-income farmers, to conserve land resources, and to lay a basis in other ways for a sound agriculture may be undermined if farm-land values and farm-land sales increase excessively. It is not desirable to interfere seriously with tenure-improvement trends, such as have land purchases as one of their mainstays. But control measures can be adjusted to take care of that, without going to a point where the central essential objectives might be endangered. The broad need is stablization of land values and credit conditions. All groups that have an interest in farm-property values stand to benefit. Owner-operators, landlords, credit agencies, individual lenders, taxing authorities, and banking institutions would have protection of their equities. Control measures should be of a complementary rather than alternative character, with each step fitted into a planned pattern, leading to an increasingly comprehensive and coordinated control system—carried, however, only to the degree necessitated by probable developments. Such a program may prove to be an essential adjunct to our system of wartime economic regulation.

Activities of the Commodity Credit Corporation

As a part of the farm-program machinery, the Commodity Credit Corporation does five main things. It makes loans to farmers on products stored on farms and in warehouses; sells unredeemed loan stocks to aid in the wartime production of food and military supplies; supports prices to farmers and helps to maintain OPA ceilings; acquires and distributes supplies of farm commodities required in war production of various kinds, especially in farm production needed to offset reductions in our imports; and acquires surplus agricultural commodities produced in foreign countries friendly to the United States.

Commodity loans made to farmers by the Corporation in the fiscal year 1942 totaled 610 million, as compared with 452 million dollars in 1941. Most of the increase reflected an increase in crop-loan rates to 85 percent of parity. Loan stocks were drawn upon heavily to supplement commercial supplies of food, feed, and fiber in meeting war needs. The Corporation's loan stocks of cotton, corn, tobacco, and naval stores were considerably smaller when the fiscal year ended than at the close of fiscal 1941. Loan stocks of wheat, however, were larger.

Government-owned stocks of cotton, corn, and tobacco were likewise reduced. The Corporation sold more than 1 million bales of cotton in the domestic market and delivered nearly 1 million bales to the British Government on lend-lease account. It also sold much tobacco to exporters, and made considerable additional tobacco available for export under the Lend-Lease Act. Corn and wheat it sold to producers of meats, milk, poultry, and eggs, for livestock feeding, and to distillers, for the production of industrial alcohol. These sales lowered the Government-owned stocks of corn but not those of wheat, because farmers turned large quantities of loan wheat over to the Corporation.

Price supports through loans and purchases of both basic and nonbasic crops aided the Food for Freedom program. Loan and purchase agreements with producers of oilseeds and agreements with processors on pricing. storing, and marketing helped to increase the oilseeds supply for military, lend-lease, and civilian uses. These and other CCC loan and purchase operations protected prices to producers, and tended to preserve wholesale and retail price ceilings announced in the anti-inflation program. Similar programs applied to pork produced by small packers; the special purpose was to facilitate the processing of the year's record pig crop. Similar programs applied also to fluid milk in the New York metropolitan area and helped to maintain the production.

The Corporation had 19 loan and purchase programs in operation during the fiscal year to encourage the domestic production of com-

modities formerly imported or the domestic production of substitutes. These programs covered purchases of hempseed for expanded production in 1943; of sorgo for conversion into industrial alcohol; of a special sea-island cotton fiber; of flax straw, seed crops, and hybrid seed corn; of bagging materials, steel and prefabricated wood bins; of cotton bagging for bale covers; of Alaska spruce logs for airplane construction; of gum rosin and gum turpentine; of pyrethrum seed; of tags for peanut packaging; of portable grain-loading elevators; of seed for winter cover crops; of castor-bean seed for distribution among farmers who want to produce castor beans; and of peanut seed for the oil-crops program.

The Commodity Credit Corporation has been designated by the Board of Economic Warfare as the public agency for the importation of most agricultural products. Accordingly, it is buying large quantities of vegetable oils and oil-bearing materials, coffee and cocoa, flax fiber, rotenone, and cotton. Some of these purchases are for war use; others are for the relief of economic distress in Latin American countries that are cut off from their usual markets. Contracts had been signed by the end of September for the importation of more than 250,000 tons of some 20 different oils and oil-bearing materials. In the handling of these products an emergency group of importers will act for the Corporation.

Practically all the activities of the Corporation promote the Ever-Normal Granary program. Developed in peacetime to equalize supplies and prices, as between good crop years and bad, this program in wartime becomes a mainstay of the Food for Freedom drive. It helps to safeguard the Nation against shortage of food, feed, and fibers, to facilitate increased production of crops and livestock, and to make farm commodities available for industrial and war uses. Against future needs it accumulates stocks of both domestic and foreign agricultural commodities. It is the integration of many departmental activities, from aids to farmers in the adjustment of their production and marketing to programs for conserving resources, insuring crops, financing production, and supporting prices. These interdependent activities look now toward the paramount objective of abundant production for military, lend-lease, and civilian use.

Farm Credit

Financing farms and farm production becomes a more complicated problem in wartime. Credit institutions under the Farm Credit Administration besides helping to finance normal production and increased production called for under the Food for Freedom program must also discourage speculation in farm real estate. They also have increased responsibilities in assisting farmers' cooperative organizations to handle an increased volume or new types of farm products.

As early as September 1941, the Governor of the Farm Credit Administration called a conference of farm organizations and representatives of institutions that make farm mortgage loans, and directed their attention to the probable bad effects of a land boom. The conference appointed a committee, which has met periodically to discuss means of maintaining a healthy farm real-estate market.

Many of the factors which caused a land boom after the first World War were again in the picture in 1942; but other factors were present which may help prevent such a catastrophe. These included price ceilings on commodities; a developing shortage of farm equipment and labor; relatively low prices measured by the standards of World War I; and a larger supply of farms on the market, as a result of acquisitions by lenders during the depression period. The policy followed by the Federal land banks and the Land Bank Commissioner is to lend only on a basis of normal agricultural values, and the Farm Credit Administration urged private lenders to do the same.

Thousands of farmers remember the disastrous results of land speculation during and after the last war, and this time are using much of their increased income to reduce their farm mortgages. For example, 6 insurance companies which hold about half of the $900,000,000 farm mortgage investment of the insurance companies reported that during the year ended June 30, 1942, farmers paid off more than 10 percent of the principal amount of their loans. During the same period farmers paid $238,000,000 on the principal of their mortgage loans from the Federal land banks and the Land Bank Commissioner. New borrowings on mortgage from these sources were only $91,000,000.

Reduction of farm indebtedness has been accompanied by an improvement in the condition of Federal land bank and Land Bank Commissioner loans. On June 30, 1942, 86 percent of the farmers with land bank loans and 84 percent of those with Commissioner loans had all their installments current, compared with 80 percent and 78 percent, respectively, a year earlier. During the same period farmers repaid a total of $22,821,907 on Emergency Crop and Feed loans. Over $2,500,000 of these repayments were on loans made during the period from 1918 to 1937. Most of this latter group of loans

were no longer secured because the sale of the original collateral, the crop or livestock financed, was insufficient to pay off the loan.

The Federal land banks and the Land Bank Commissioner have encouraged farmers to reduce their debts and also to lay aside a reserve in a "Future Payment Fund." Under this plan individual farmers can build up reserves with the banks or with the Commissioner to meet future installments on their long-term mortgage loans. On the money they put in the fund they receive interest at a rate equal to what they pay on their loans.

Part of the farm mortgage debt load after World War I resulted from the piling up of short-term debts which subsequently had to be rewritten into long-term mortgages. With this experience in mind, large numbers of farmers are not now inclined to speculate.

In the field of short-term credit, the 530 cooperative Production Credit Associations are meeting the usual as well as the wartime credit needs of old and new members. The Associations provide the credit necessary to help farmer-members meet the goals set by County War Boards, but urge them to do so as far as possible by making better use of present facilities, rather than by speculative overexpansion.

Under this policy Production Credit Associations loaned $418,000,000 during 1941 or an increase of 16 percent over the previous year. In the first 6 months of 1942 they loaned 21 percent more than during the first 6 months of 1941. On the other hand repayments on loans by farmers to the associations were 28 percent higher during the first 6 months of 1942 than in the first half of the previous year.

Farmers' purchasing and marketing associations have been quick to meet the problems connected with handling the larger volumes of business that result from increased farm production. Many of them have found it necessary to borrow more money. During 1941 the 13 banks for cooperatives extended credit totaling over $220,000,000. This was an increase of 75 percent over the previous year. During the first 6 months of 1942 the amount of credit extended by the banks was 44 percent greater than during the first 6 months of 1941. On June 30, 1942, 1,732 associations had outstanding loans from the banks.

Crop Insurance

Crop failure occurs somewhere every year. Farmers must have some defense against it, especially now that the Nation is fighting for its life and freedom. The farm front must be strong. Crop insurance in the Wheat and Cotton Belts, where crop failures occur frequently, is an important farm-front strengthener.

This program had its origin in 1939, when the Government first offered crop insurance to wheat growers. The program developed valuable experience, which allowed defects to be cured and improvements to be made before the war broke out. Encouraged by this experience, the Government this year offered crop insurance to cotton growers. The experiment promises to afford new evidence that insurance on growing crops is practical and socially desirable, and that it saves money for taxpayers through declines in the relief load.

Our abundance of wheat and cotton does not lessen the importance of guaranteed returns to growers of these two crops. Such farmers have been asked to restrict their wheat and cotton acreages. Consequently they have more need than ever to be assured of a reasonable return from the acreage they do plant. With such assurance provided, they can turn with more confidence to the production of other things on part of their land. The program to guarantee returns equivalent to average wheat and cotton yields meshes well with the country's war job, because it replaces overplanting as protection against crop failure.

Prices for wheat and cotton are now relatively high; they will probably stay relatively high for the duration of the war. But price, as every farmer knows, means nothing to the grower whose crop is destroyed by unavoidable causes. Indeed, the higher the price, the greater his loss through crop failure; and with each crop failure suffered, the grower runs additional risk of being transferred from the role of taxpayer to the role of a burden on other taxpayers. Hence crop insurance is socially as well as individually beneficial.

The social benefits include more or less indirect advantages to all the people who live in crop-failure areas. This is obvious where wheat and cotton are the important cash crops. But the benefit extends beyond such local areas to large urban populations whose incomes depend partly on farm incomes.

GROWTH OF PARTICIPATION

The extent to which the crop-insurance program can alleviate distress caused by crop failure bears a direct relation, of course, to the number of farmers who buy this protection. In this respect the results have been progressively encouraging. Participation has increased substantially from year to year. On the 1939 crop, 165,775 wheat-insurance contracts were in force. Approximately 379,000 wheat con-

tracts were written on the 1940 crop; 420,900 on the crop of 1941; and a comparable insurance figure of slightly more than half a million on the crop of 1942. Some of these contracts did not become operative because the farmers did not seed wheat, or for other reasons were not eligible for insurance. But the number of contracts written showed that all-risk insurance, the type which the contracts provide, has the approval of the people most concerned; namely, of the farmers themselves. On the 1942 cotton crop, insurance contracts covered approximately 170,000 producer interests. The Department is working on plans and actuarial bases for insurance on other crops, especially corn, tobacco, rice, citrus fruits, and forest products.

About 56,000 wheat growers received indemnities in 1939; 113,000 in 1940; and 131,000 in 1941. In these 3 years they received some 52 million bushels, or its cash equivalent, as indemnities. To meet these losses the Federal Crop Insurance Corporation used, in excess of the premiums collected, about 13½ percent of its $100,000,000 authorized capital stock. This capital stock was intended to function as a reserve to meet losses in excess of premium collections. In years when collections exceed losses the reserve will be restored. At the beginning of fiscal year 1943 relatively few losses to the 1942 wheat or cotton crops had been reported. Premium collections on the 1942 wheat crop may exceed losses by several million bushels. Cotton losses in 1942 will not be known until near the end of the year.

Participation in the crop insurance program is voluntary, and many growers have unfortunately taken advantage of this feature and have insured their crops only when they believed their crop prospects were poor. The result has been heavy participation in potential loss areas and light participation where the reverse was true. Losses have consequently been out of line with the actuarial picture. New features of the programs will partly cure this inequity. The 1943 wheat program and future wheat insurance programs will require the grower to insure for a term of 3 years. Another provision to prevent an adverse selection of risks is the requirement that a grower must insure all the acreage in which he has an interest in any given county, rather than only those units where a loss is most apt to occur.

PLAN FOR INSURANCE-COST ADJUSTMENTS

The chief deterrent has been the belief by farmers that the cost is too high, even though the cost to the grower does not include a charge for program administration. Premium rates are based on the premise that what has happened in the past is likely to occur in the future. Such a premise, however, is not infallible. It may not adequately reflect the effect of improved farming practices, better managerial ability, and weather cycles on farm productivity. Farmers who believe the cost of the insurance is too high will have an opportunity to prove their belief, and the better farmers will have more encouragement to insure their crops, under a reduced premium plan which has been devised. It provides that the grower may have his premium reduced by as much as 50 percent when the aggregate of the premiums paid over a consecutive period of years is equal to or exceeds the amount required to indemnify one total loss.

Rubber Research and Cultivation

"Of all critical and strategic materials," said the report of the Baruch Rubber Survey Committee, "rubber is the one which presents the greatest threat to the safety of our Nation and the success of the Allied cause. Production of steel, copper, aluminum, alloys, or aviation gasoline may be inadequate to prosecute the war as rapidly and effectively as we could wish, but at the worst we still are assured of sufficient supplies of these items to operate our armed forces on a very powerful scale. But if we fail to secure quickly a large new rubber supply, our war effort and our domestic economy both will collapse. Thus the rubber situation gives rise to our most critical problem."

"Only Buna S and neoprene synthetic rubber," the Baruch report said, "can be used for combat and heavy duty tires." And it added that the year 1943 may be so critical for the rubber situation that the production of 100,000 or 200,000 tons of Buna S may be the determining factor in the success of our military program.

Besides recommending increased Buna S production from petroleum and natural-gas products, the committee proposed another increase from grain. It advised erection of a plant, located near the grain area, for the production of an additional 30,000 tons of Buna S by a grain-using process. It recommended that this plant should be erected during the latter part of 1943 for operation during 1944. It saw two advantages in delaying the construction of the plant until then: First, the likelihood that the shortage of critical materials will then be less acute; and second, it will be possible within the next few months to judge better as to the relative merits of different processes of making butadiene from grain.

As part of this program, the committee recommended provision of additional facilities for producing alcohol. It proposed specifically that facilities should be erected, on sites near the grain-producing area and accessible to water transportation, for the production of 100 million gallons of alcohol. This proposed addition, it explained, would provide only enough additional alcohol to meet the increased demands of the expanded synthetic program.

The report said the committee had received assurances from the Secretary of Agriculture that no concern need be felt that increased production of alcohol and butadiene from grain would interfere with our food supply. There would still be upwards of 1,250,000,000 bushels of wheat left on this continent after all anticipated grain-food requirements had been met.

The Baruch report advised action to remove legal restrictions on guayule acreage, and to provide certain farm equipment. It said this was necessary "to avoid a whole year's delay in expanding the planting

of guayule, which can become a major source of new crude rubber within a few years."

Research on rubber in the Bureau of Agricultural Chemistry and Engineering has been pushed on various fronts, some of which have to do with rubber substitutes, some with synthetic rubber, and some with phases of the natural-rubber problem, such as the designing of equipment for use in the growing, harvesting, and processing of new latex-yielding crops.

Almost since the beginning of the wide use of natural rubber, efforts have been made to produce the same material artificially and to create substitutes. Now, under the pressure of scarcity and the urgency of war uses for such materials, research efforts have been multiplied by the Government and by rubber-using industries in the hope that when present supplies have dwindled there will be an ample production of materials suitable for the various places now filled by natural rubber.

Search for ways of making rubber substitutes, elastomers, and materials useful in this field was going on in the Bureau before the war began. Some of this work has been started in certain of the new regional research laboratories and some in the Bureau's laboratories in Washington. These laboratories have assigned to them the research task of finding out what they can about making rubber or rubberlike materials from farm crops that are already available in great quantities—so that once a good method is found there will be no great delay in producing the raw material.

A process of making a Buna-type rubber is already well known, but to tap this source it is necessary to take full advantage of the facilities for producing alcohol and to build equipment for converting alcohol to rubber.

As soon as facilities for experimental work were available in 1940 the Northern Regional Research Laboratory undertook an extensive program on making synthetic rubber intermediates and rubber substitutes from farm commodities. After Pearl Harbor it stepped up this research and at the end of the fiscal year 1942 a substantial part of the technical staff of the laboratory was devoting full time to the problem. The attack was from three angles: (1) Fermentation of corn, wheat, and other carbohydrate materials to 2,3 butylene glycol, followed by the dehydration of this chemical to butadiene, a material from which Buna rubber can be made by well-known procedures; (2) chemically changing the linoleic acid of corn, wheat, soybean, and other vegetable oils to form elastic and vulcanizable substances having some of the properties of natural rubber; and (3) studying the technology of industrial alcohol production from farm crops to get the maximum yield at the lowest possible cost in the hope of obtaining cheaper butadiene.

Considerable work was done on the conversion of furfural, derived from hulls, cobs, and other crop residues, to pentadiene, which is related to butadiene in structure and properties. Since the work is of a somewhat long-term nature, it has been held in abeyance and the personnel and research facilities devoted to the butylene glycol problem, which holds greater possibilities of early application.

The first of these angles of approach, the fermentation of corn, wheat, or other carbohydrate material to 2,3 butylene glycol, offers a

possible method of producing rubber from farm crops; moreover, the intermediate material, 2,3 butylene glycol, holds promise of numerous peacetime uses, such as for antifreeze for automobile radiators, and commercial solvents, as well as a number of chemical applications for war industries.

The efficient and economical fermentation of ground corn or wheat to the 2,3 butylene glycol has been done at the Northern Regional Research Laboratory. To remove the butylene glycol from the fermentation mash in a manner industrially feasible is a problem, but the Laboratory reports progress toward development of a successful method. Several industrial concerns are now producing butylene glycol on a pilot-plant scale as a result of information furnished them at conferences held at the Department's Peoria Laboratory. Conversion of the 2,3 butylene glycol to butadiene has been accomplished successfully and in good yields in the laboratory and the process is now being studied on a pilot-plant scale. The final step—production of synthetic rubber from butadiene—is in use in many places today.

In the second method of attack on the synthetic-rubber problem at the Northern Regional Research Laboratory it has been found possible, by the use of commonly available equipment, to produce from domestic vegetable oils a vulcanizable product with interesting rubberlike properties. Production and utilization tests are under way in industry. Whether this material can be so improved as to make satisfactory tires and other essential products remains to be worked out.

A complete pilot plant for making alcohol has been built in one wing of the Laboratory at Peoria and is now being used to develop and evaluate new processes for the manufacture of both alcohol and 2,3 butylene glycol.

Chemists and engineers of the Bureau have been working on various other aspects of the rubber problem, including such matters as the extraction of the latex from different rubber-yielding plants, adapting machinery and methods to the harvesting of such plants and their seeds, and the making of rubberlike substances from a variety of farm products. Included in this last category is a study of the preparation of synthetic-rubber intermediates and rubber-compounding materials from lactic acid derivatives that may come from starch, whey, and cane- and beet-sugar juices and sirups.

Some attention has been given recently to the possibilities of making rubber substitutes from nonfood crops. The principal tested raw material in this class is turpentine, already the source of isoprene, used commercially with other things in the production of butyl rubber. Another turpentine derivative the Bureau has found promising for this purpose is myrcene, which is obtainable in large yield from both gum and sulphate wood turpentine. (Myrcene was discovered nearly 50 years ago by Frederick Power, at one time a member of the Department.) Some of the rubber industry laboratories, which are cooperating with the Bureau, report their tests indicate this material can be combined with butadiene to make a substance of considerable tensile strength and elasticity.

Special efforts are being made to reduce the manufacturing costs of certain materials known to be useful in the making of plastics

and synthetic rubber. One of these is synthetic methyl acrylate, which can be made from lactic acid.

Production of natural rubber requires a definite period which science has been unable to shorten. This Department's rubber investigations have dealt heretofore with the rubber content of rubber-yielding plants, and with other agronomic problems, rather than with large-scale extraction of the rubber. Time is required to develop or improve commercial extraction methods. Production of some natural rubber, however, may be hastened by utilizing various rubber-yielding plants.

The Department's program for production from both the long-period and quickly maturing or emergency rubber species rests on the following premises: (1) There is no certainty of being able to produce any large tonnage prior to 1945. (2) During the next 2 years military needs will, of necessity, be filled from the following sources: (a) The accumulated stock pile of crude rubber from the Far East, (b) increased production of wild rubber in Latin America, (c) more extensive reclaiming of rubber, and (d) rapidly expanded synthetic output. (3) Since the war may last for years, an increased supply of fresh crude rubber becomes a vital necessity; it will be needed to mix with synthetic rubber to build the carcasses of tires and for certain uses demanding natural rubber exclusively.

THE GUAYULE PROGRAM

Natural rubber has been produced for many years from guayule, a desert plant native to northern portions of Mexico and the Big Bend area of Texas. Commercial shipments of guayule rubber from Mexico have long been made; but Mexico's production has never exceeded about 10,000 tons annually. The Intercontinental Rubber Co. in 1907 began experimenting with guayule in the United States. It developed an improved, cultivated strain and entered into limited commercial production, with several hundred acres of plantations and a small extraction plant in the Salinas Valley of California. Guayule rubber in this country, however, could not compete at normal prices with the plantation rubber from the Malay States and the East Indies. There was no encouragement to any large extension of the acreage. Nevertheless the experiment helped to demonstrate the properties of guayule rubber, which became known in the trade and was in fact considered superior to Hevea rubber for certain uses. After Pearl Harbor it jumped to prominence immediately as a useful domestic source of natural rubber.

Under the Emergency Rubber Production Act (approved March 5, 1942), Congress authorized the Department to acquire the properties and processes of the Intercontinental Rubber Co. and expand guayule production in the Western Hemisphere. The Secretary assigned production phases of the program to the Forest Service and essential technical investigations to the Bureau of Plant Industry and the Bureau of Agricultural Chemistry and Engineering. Work started immediately, in a race against time, to increase nursery pro-

duction of guayule seedlings, because the seed had to be in the ground before the start of the dry season or a whole year would be lost.

About 1,500 seedlings were planted on the afternoon of the day the President signed the Act. Field planting of 870 acres, in addition to the nursery sowing, was completed in less than a month. In a little more than 2 months, 530 acres of nursery beds were soil-tested and prepared, and 21,000 pounds of seed treated and sowed. The nursery planting will provide enough seedling plants for about 50,000 acres of field plantations in the winter of 1942–43. The job also required the leasing of nursery sites, the installation of an overhead irrigation system, with 94 miles of pipe, the laying of 1,014 miles of duckboard tracks for machinery between nursery beds, the construction of a seed-treating plant, and the provision of housing for 1,000 workers.

Some rubber can be obtained from guayule within a year after the field planting; the yield increases annually for a number of years. The most economical harvesting rotation is usually 4 years. This has given yields of from 1,200 to 1,500 pounds of rubber per acre. Seed obtained from the 1942 plantings will permit planting up to the 75,000 acres authorized. Should the rubber shortage be prolonged, the expansion could be continued. The Forest Service is looking for additional suitable areas, and setting out test plots in the Southwestern States. It is investigating the supply of native guayule in southwestern Texas.

VARIOUS RUBBER-YIELDING PLANTS

The Department has tested large quantities of rabbitbrush collected in western national forests. This common range shrub contains a rubberlike substance, as do goldenrod, rubbervine, Colorado rubberweed, milkweed, burroweed, and other native American plants. The quality and properties of their rubber, and the best methods of extracting it, are still largely unknown. Though synthetic rubber offers the best hope of meeting the Nation's emergency rubber requirements, the development of natural rubber supplies is important. Both reclaimed and synthetic rubber require at present an admixture of natural rubber for tires and most other uses.

Prior to early May 1942 Russian dandelion (*kok-saghyz*) had never been imported into the United States. Air shipments totaling 500 pounds of Russian dandelion seed were received and apportioned to experiment stations and other agencies in 25 northern States, Alaska, and Canada. Here climatic conditions approach those of the areas in the Union of Soviet Socialist Repulics where the dandelion is now being grown.

The cultivation of this plant has expanded rapidly in the U. S. S. R. in recent years and plans were made to plant 2 million acres in 1942. It is harvested at the end of the first growing season. It yields from 30 to 60 pounds of rubber per acre per year. The rubber occurs in latex in the roots, which are much larger than those of our common dandelion. Both field and factory operations have many similarities to the sugar-beet industry, and in the off-season some

sugar-beet equipment might be adjusted for processing dandelion. The roots are sliced, pulped, boiled, and centrifuged, and the rubber is removed by skimming the resultant extract.

In 1934 the Department took over the special strains of goldenrod and continued the selection work which had been successfully advanced by the late Thomas A. Edison. Further increase in their rubber content has been obtained, but prior to the present emergency it had not been possible to produce a quality of rubber acceptable on the American market. Tests by the Bureau of Standards showed a tensile strength of 50 percent, and resistance to abrasion of only 35 percent of that of Para. Nevertheless, for certain uses rubber from goldenrod will now be acceptable despite its impurities.

As a crop goldenrod is readily produced and handled by machinery, but the great problem is to find a satisfactory method of extracting the rubber. None of the mechanical and chemical solvent methods do so efficiently. The Department is cooperating with other research agencies in an attack on this problem. Meantime, planting material of the improved strains has been multiplied a hundredfold in 1941 and 1942. The present area covers about 150 acres at a testing station near Savannah, Ga.

Madagascar rubber vines (*Cryptostegia madagascariensis*) have been widely planted as ornamentals in tropical America and southern Florida. Rubber obtained from incisions in the bark is of good quality, but the quantity in roots, stems, and leaves is only about 3 percent of the dry-plant weight. The Department has investigated a hybrid *Cryptostegia grandiflora*×*C. madagascariensis*, which is more vigorous and higher in rubber content than either of the parent plants.

Here again a practicable method of extracting the rubber in large-scale operations remains to be developed. Nevertheless, a large quantity of seed of the *C. grandiflora* is being accumulated from areas in Mexico, Central America, and the West Indies, where the plant has become naturalized, to enable large-scale planting when present rubber-extraction experiments warrant it. If these are successful, here is a plant, like goldenrod, that can be handled by machinery and may produce rubber in a year with increasing yields in succeeding years.

Hundreds of other rubber-yielding plants have been analyzed and studied by the Department. Thus far, the species discussed above have been found to offer greatest promise toward relieving the immediate emergency.

RUBBER IN LATIN AMERICA

In June 1940, under the Second Deficiency Appropriation Act, the Department was granted $500,000 to undertake experimental work and promote rubber planting in the Western Hemisphere. The fall of France, and Japan's announced policy of "Asia for the Asiatics" made it imperative that rubber production be returned to its birthplace in Latin America. The funds were budgeted over a 3-year period and cooperative projects were immediately arranged with 15 American republics where the hevea rubbertree can be grown. The widespread

cooperative program is conducted from 3 field stations supported mainly by this Department and 7 stations maintained entirely by other countries.

More than 100 of the highest-yielding clones developed during 30 years of research in the Far East were imported prior to the outbreak of war in the Pacific. Strains combining resistance to the South American leaf blight with superior yield have been selected in Brazil and Costa Rica, and are being propagated and distributed as rapidly as possible for commercial planting. For this purpose some 25,000,000 seed have been planted to produce seedlings on which to bud-graft the superior strains. This work includes operations of the Ford and Goodyear companies, which have plantations in Brazil and Central America, respectively.

This far-flung project, though still largely in the nursery stage and unable, as yet, to contribute rubber for the immediate emergency, has assumed great significance in the agricultural future of many of our neighbors to the south. Particularly as a small-farm, or 1-family enterprise, rubber growing promises to meet post-war competition, to provide a much needed cash crop for complementary trade, and to strengthen the internal economy of the Latin American republics.

Recently this long-term project has been unexpectedly accelerated by the emergency wild rubber collection program of this Government throughout Latin America. Several of the cooperating countries are justifiably hesitant to make the necessary investments in transportation and sanitation, and to shift populations in order to get out the maximum quantity of wild rubber merely for the duration of the emergency. Now, the cooperating governments are providing improved rubber planting material to the rubber gatherers for planting with food crops in the off-season to make them permanent settlers and thus avoid possible political repercussions when peace comes and high rubber prices no longer prevail. Therefore, the war agencies of this Government and their Latin American cooperators are emphasizing the practical extension phases of this permanent program.

Encouraging Long-Staple Cotton Production

More production of the longer staple cotton is necessary to meet requirements created by the war emergency, and the Department announced increased premiums for the longer staple lengths under its 1942 loan program. It asked State and County War Boards to survey the seed situation, help farmers in getting seed of long-staple varieties, and assemble useful technical information. Though we had a large cotton supply, the amount of long-staple on hand was insufficient for the multiplying war needs.

For long-staple upland the goal for 1942 was about 1,400,000 bales or about 700,000 bales above the production of long-staple upland last year. The Department asked growers to make the change within their existing cotton-acreage allotments, through shifts to varieties of slightly longer staple length. On August 1, 1941, the carry-over of upland cotton of 1⅛ inches or longer was a little over 700,000 bales, and the total 1941 production was about the same. The increase requested considered current requirements and the need for a safe reserve.

Yield per acre of the long-staple upland cottons—1⅛ inches or longer—is generally lower than of the shorter varieties. The premiums announced took this fact into account. Briefly, the premiums encouraged long-staple upland production, both rain-grown and irrigated, with a staple length of 1⅛ inches or longer, on the basis of the average market differentials that prevailed during the 1941–42 crop year, plus an addition necessary to furnish incentives for the production of the longer staple though lower yielding varieties, with location differentials based on the relative sales value of cotton in different domestic markets. Also, the Department emphasized the need of longer staple cotton in the better grades; the lower grades often bring farmers no more income than medium staples. Farmers increased their plantings of the longer staples and took extra pains to harvest the crop carefully and get it properly ginned.

Certain areas in Mississippi, Arkansas, Louisiana, Missouri, Tennessee, South Carolina, North Carolina, Florida, and the irrigated areas of Texas, Arizona, New Mexico, and California, are the chief sources of long-staple cottons, and it was, therefore, in these sections that the program had most significance. So that it would not cause a decrease in the production of cotton 1$\frac{1}{16}$ and 1$\frac{3}{32}$ inches in staple length, but would in fact encourage a shift into these lengths from the still shorter ones, the premiums for upland cotton included an increase also for various grades of 1$\frac{1}{16}$ and 1$\frac{3}{32}$ inches.

Though directed primarily to upland, the movement included American Egyptian and sea-island. The Department announced appropriate premiums for these cottons and asked growers of American Egyptian to plant at least 300,000 acres in 1942. For sea-island extra-

long staple the acreage goal was somewhat above the actual 1941 acreage and three times the 1936–40 average. Acreage allotments do not apply to American Egyptian and sea-island, which constitute only a small fraction of our total cotton output. They have increasingly important war uses.

American Egyptian cotton, because it requires a very long growing season and thus far has been grown only under irrigation, until recently was restricted almost entirely to Arizona, but some was grown last year in New Mexico and western Texas. The production in the 1941–42 season was about 62,000 bales, as compared with only 12,000 bales as recently as 1937. Most of the American Egyptian cotton now grown is of the variety known as S×P, a cross of Sakellarides and Pima. Formerly it was largely Pima (itself a cross between American and Egyptian). Production of sea-island in 1941 was only about 2,800 bales as compared with an acreage of about 100,000 bales in 1916 and 1917. Boll weevil infestation was the chief cause of the decline.

LONG-STAPLE SEED SUPPLIES

Seed supplies were the chief limiting factor in the program to increase the long-staple production. Some farmers had difficulty in getting seed of long-staple varieties. The State and County War Boards compiled lists of the supplies available within each county, and furnished the names and locations of persons from whom seed could be obtained. They helped farmers to determine the source and purity of the supplies. Best sources were the large cotton breeders, the one-variety communities, and the certified seed growers. Comparatively few varieties produce the staple lengths desired. The Department recommended: Coker 100 and Wilds in the Southeast; Coker 100, Delfos 531, Delfos 6, Delfos 9252, selected strains of Express and Bobshaw, Stoneville 2 B, and Wilds 11 in the Mississippi Valley; and Acala 1517 in the irrigated section.

Through contact with seed dealers and others, the State and County War Boards urged the importance of keeping seed prices reasonable. They said about twice the quotation of oil-milled seed would usually be fair. For the most part the distribution was through normal channels, in many cases directly from producer to user. Farmers wanted to know the varieties, the supplies, the sources, the prices, and qualities; and the State and County War Boards provided information on all these points. In the irrigated districts an OPA freezing order forbade the sale for crushing of American Egyptian seed suitable for planting. Growers had therefore an exclusive call on the supply.

Cotton has a big place in aircraft construction. It enters into the fabric used for the control surfaces of combat planes; into the construction of Navy patrol bombers which, though made chiefly of metal, use more cotton fabric than completely cotton-covered small planes; and into training planes, which have cotton-fabric coverings. Airplane fabric is chiefly American Egyptian cotton of 1½ inches or longer staple. Cotton is necessary for other military equipment, such as balloon fabrics, flotation gear, machine-gun belts, and parachutes. Man-carrying balloons particularly require fine cotton. Even the best sea-island cotton barely meets the strength specifications. Few mills

in this country can make the highest quality of balloon cloth. Barrage balloons are being made of American Egyptian cotton, on strength specifications below those established for the best balloon cloth.

Flotation gear, such as inflatable life rafts and other lifesaving equipment, requires rubberized fabric manufactured from American Egyptian cotton or about its equivalent. Machine-gun belts, used for feeding ammunition into the guns, have been made generally of sea-island cotton. More recently cotton 1½ inches or longer in staple has been specified—in other words, mostly American Egyptian. The increased demand for American Egyptian may result in the use for some military purposes of "combed peeler," the staple length of which may or may not be specified, but which usually ranges around 1$\frac{3}{16}$ inches.

Cotton is taking the place of linen in "shrouds" or parachute lines, though not in parachutes. For making the shrouds sea-island cotton is preferred. Cotton cloth can be made that is strong enough for parachutes, but it tends to "pack." This bad feature makes it necessary to use Nylon or other artificial fiber to replace unavailable silk. Military requirements for cotton also include great quantities of sewing thread, made usually from combed cotton of all lengths from 1⅛ inches upwards. Cotton articles and fabrics for practically all military uses have to be of uniformly high quality, because they must stand hard usage. They have a short life at best, as compared with the same articles and fabrics in civilian use. In large measure the specification of high quality is a call for more production of the longer staples and the better grades.

Fiber-Plant Studies

Food and fiber are the two major contributions of agriculture to the welfare of the human race, and the continued maintenance of adequate supplies is a war emergency. The need for increased food production is obvious, but the urgent need for more fiber too is less apparent. There is no shortage of clothing as yet and the other uses of fiber are not matters of everyday concern.

Civilized life as it is known today could not exist without the products made from plant fibers. Every home and shop, every factory and mine, every farm and ship uses materials and articles made from the plant fibers. Textile fabrics for clothing and upholstery; cables and ropes for ships; twines and threads for field, factory, and home use; bags for packaging; and hundreds of other things remind us of our dependence on fibers.

Nearly 2,000 recognized species of plants yield useful fibers or fibrous materials, but only a few of these fibers enter world trade and are used in industry. The definitely emergency fiber problems concern mainly 8 different fibers; namely, cotton, abacá, sisal, henequen, jute, flax, hemp, and kapok. How can we get adequate supplies of these fibers or of acceptable substitutes? Secondary problems, which may nevertheless become serious as war priorities absorb critical materials, have to do with the handling, transporting, and manufacturing of fiber materials.

Cotton we produce abundantly in the Western Hemisphere, and the entire world's supply of henequent grows in Mexico and Cuba. Abacá, sisal, jute, flax, hemp, and kapok have heretofore been produced mainly in the Eastern Hemisphere. Our supplies of these fibers have been eliminated or reduced, and the shortage must be met by increased production in the Americas of these same fibers or of substitutes.

Most important of the hard fibers is abacá (Manila hemp). Abacá furnishes the raw materials for all high-grade rope, especially marine rope. Produced heretofore only in the Orient, our supply is now cut off. Fortunately the Department made some preparation for this emergency. In 1925 it brought a shipment of about 1,000 carefully selected abacá plants from the Philippine Islands to the Republic of Panama. Experimental plantings showed that the climate and the soil of Panama were favorable for this plant, and that in its new home it would produce fiber of excellent quality. These plantings, expanded first to 50 acres and afterwards to 2,000, provided an abundant supply of propagating material. A large acreage of abacá is now being planted both in Panama and in Costa Rica. Abacá will be produced in these two countries in steadily increasing quantities, and possibly in other countries of Central America.

American hemp, made from the plant *Cannabis sativa*, is considered to be the most satisfactory substitute for abacá in the manufacture of marine cordage. As hemp is an annual plant, which can be grown in many different sections of this country, a large increase in hemp production is entirely practicable. Some 36,000 acres of hemp are being grown this year, principally in Kentucky, for the production of seed. This acreage should furnish enough seed for 300,000 or 400,000 acres of fiber hemp next year, if we need it.

Henequen, produced in Mexico and Cuba, and sisal, produced in the Netherlands Indies, the colonies of East Africa, and Haiti, enter world trade under the trade name of "sisal." These two fibers are of high importance. Henequen furnishes the bulk of the raw material used in the manufacture of binder twine; sisal provides material for miscellaneous cordage and twine. It is a substitute to some extent for abacá. This Department is helping to promote increased plantings of sisal in Haiti and improvements of the henequen plantations in Mexico.

The acreage of fiber flax in the Pacific Northwest region has been expanded from an annual average of about 4,000 acres to approximately 16,000 acres. Moreover, increasing supplies will be available from Peru and Canada; so it appears we shall have enough of this fiber.

Jute furnishes the raw material for hundreds of millions of burlap bags and many other purposes. Only India produces it in large commercial quantities. The jute plant can be grown in tropical and subtropical regions in the Americas. But no machines for cleaning this fiber have been perfected, and the hand-cleaning methods used in India are slow and laborious. Several acceptable substitutes exist, however, and these plants are now being grown experimentally in the United States and in other countries of this Hemisphere.

Kapok is a filling material used principally for cushions and mattresses, in the manufacture of life-saving apparatus, and for insulation purposes. Java has been the principal source of supply, but small quantities have been obtained from Ecuador, and the Ceiba tree which produces kapok is widely distributed in Tropical America. Floss produced by the common milkweed may serve as a substitute for kapok. Experiments are under way to see if this is so.

In November the Department announced a production and processing program expected to yield about 150,000 tons of hemp fiber in 1943 for manufacturing principally into cordage for military and essential civilian purposes. The announcement followed issuance of a letter of intent by the Defense Plant Corporation for the financing and construction in 1943 of 71 hemp mills. These mills, for which the War Production Board assigned preference ratings, will be operated by the Commodity Credit Corporation. They will be located in six States—Kentucky, Indiana, Illinois, Wisconsin, Iowa, and Minnesota. Each plant will serve approximately 4,000 acres of hemp. Contracts will be offered to growers in these States, and the Commodity Credit Corporation will make seed available at specified prices. Special machinery needed for hemp harvesting will be supplied to farmers on a custom basis.

Shortages of Drug Plants

Before World War I this country depended heavily on the chemical and drug industries of Europe. During that war we lacked a sufficient supply of materials for preparing chemical and botanical drugs for military and civilian needs. We had to develop a chemical-drug industry of our own and to begin cultivating drug plants formerly imported. Our new chemical-drug industry thrived and after the war became of international significance.

But the competition of crude botanical drugs from older sources soon forced us to abandon the growing of drug plants here. Our practice was to import crude botanicals from countries where such plants grow wild or in cultivation. Many we imported from central Europe for economic reasons, though they could be grown in the United States. Again we find ourselves in a difficulty because we have depended on sources that war has made inaccessible. Many traders anticipated that a critical situation might develop and began to accumulate stocks of drug plants before the war began. But a critical shortage of many drug products now exists.

What can be done? Much depends, of course, on whether we should grow these crops merely for the emergency period, or as a long-time enterprise. Production of some that can be grown quickly is under way. But the possibility of making a quick return on a product of high value should not hide the fact that only a limited acreage is necessary—limited, moreover, to regions with the proper soil and climate and with facilities for drying and preparing the products. The drug plants that require a long time to develop are in a different situation. Crops that require several years to come into production, with no assurance of a market even then, do not interest many people.

Plants or their products that can be produced quickly in this country are belladonna, henbane, stramonium, digitalis, and ergot. Supplies of belladonna and henbane seed have been insufficient, since these plants have not been cultivated in the United States on a crop basis. The Bureau of Plant Industry anticipated the shortage and increased its plantings in small experimental plots. It obtained enough seed for an acreage capable of providing a major portion of the belladonna required and distributed the seed to growers in five suitable locations. Acreage now planted to belladonna exceeds what would be required in years of normal demand. There is a similar program for henbane. Seed of this drug plant, however, like that of stramonium and digitalis, is available in regions where it is native or has escaped cultivation and now grows wild. Adequate seed supplies of this group of plants can probably be obtained either from wild or cultivated plants.

Ergot, which grows on rye, is normally imported, though it can be a serious pest in grain-producing regions. The problem is to sep-

arate the ergot from the rye grain or waste screenings rather than to produce it. It is a problem in economics rather than in sources of materials. Concerns organized for the purpose of separating ergot from grain screenings which normally would be discarded provide our present supplies. The quantities available are sufficient for the present except for specialty products that require drugs available only in ergot from certain grains. It may be possible to produce this special ergot by inoculating the host plants.

Some concern exists as to a possible scarcity of crude-drug plants produced ordinarily in the United States. It may result from lack of sufficient labor to collect the materials, or from the unwillingness of collectors to pay the higher labor costs now necessary. Examples are mandrake root, calamus root, dandelion root, pokeweed root, and cascara bark, which grow wild in many parts of the United States. There are many others.

The supply of menthol presents a complicated problem. It has been provided by a synthetic process, which depends on heretofore imported oil of citronella. Attempts are being made to grow citronella grass and other plants which may yield products from which synthetic menthol can be made. Another alternative is the production of natural menthol. It requires an increase in the acreage of American mint, or plantings of Japanese mint. Japanese mint has been the principal source of natural menthol, which has been imported.

Synthetics are replacing a number of our natural drug products. Ephedrine, obtained formerly from *Ephedra sinica*, has been replaced by a synthetic ephedrine which is accepted as official by the U. S. Pharmacopoeia. Our supplies of ephedrine came previously from the Orient. Certain drug products, however, can be produced here neither synthetically nor by cultivating the plants. Suitable climatic and soil conditions do not exist in the United States. Quinine is an example, though some synthetics can do partial duty for it. Started many years ago in South America, where the cinchona plant is native, the quinine industry was shifted to the East Indies. This Department is trying now, in cooperation with the governments of Latin American countries, to reestablish the quinine industry in the Western Hemisphere. The effort includes aid in the development of cinchona plantations in mountainous tropical regions, and cooperation with Latin American scientists in technical matters.

Locating War Industries

Selection of lands for war industries and training fields and relocation of families upon them have been an important part of the Nation's transition to all-out war. The Department of Agriculture has assisted the War and Navy Departments and the War Production Board in obtaining suitable lands with the least possible disruption of agriculture and a minimum of hardship to individuals.

The urgency of increased production of military supplies led first to expanded output in established industrial areas. The program soon grew beyond the capacity of these areas, and overflowed into smaller cities, rural areas, and finally into the open country. Safety from bombing, and availability of underemployed manpower, plant and storage capacity, power, transportation, and housing were important factors in this decentralization. The spread of war plants from the Atlantic to the Pacific and from the Canadian border to the Mexican, derived considerable impetus from the development of new sources of electric power during the lean years from 1932 to 1939.

While industrial expansion for war requires large blocks of agricultural land, a much larger acreage has been needed to expand training facilities of the combat units. During the last fiscal year, the Department of Agriculture has continued to make large acreages of land available for military use. Since June 30, 1941, it has made available to the War and Navy Departments approximately 750,000 acres of national forest lands, and to the War Department an additional 80,000 acres formerly administered by the Soil Conservation Service. In a number of places it has turned over housing facilities and lands of the Farm Security Administration to serve as officer's quarters and for other military use. In some instances, the Department has made its lands available through use permits—in others, jurisdiction over the lands has been transferred to the War and Navy Departments.

Expanding air power required more and more flying fields for pilot training, and bombing ranges for target practice. Level lands that can be grassed over readily make the best flying fields—and such lands usually are fertile. The fields vary from 2,000 to 5,000 acres. Bombing ranges, on the other hand, do not require such good agricultural lands—but they must be large and accessible. For these, large tracts were cut out of the public domain or from the holdings of the Forest Service of the Department. The Government also acquired some poor and relatively inexpensive lands for bombing ranges. Some of the ranges contain more than 1,000,000 acres—most of which is rough waste land, useful only for grazing. Many new cantonments have been built, and these require from 20,000 to 120,000 acres.

All this expansion has created many problems affecting agriculture, and this Department has contributed in every way it could to their

solution. At the same time, it has recognized the fact that military needs come first in all considerations.

The Department of Agriculture is represented on the Plant Site Board of the WPB, and it maintains almost daily contacts with the Real Estate Branch of the Corps of Engineers of the War Department and with the Bureau of Yards and Docks of the Navy Department. The Real Estate Branch of the Corps of Engineers has directed the purchase of more than 700 sites, involving more than 35,000 tracts and upwards of 10,000,000 acres. More than 30,000 families have had to find new homes.

The Department of Agriculture supplied information on the land to be purchased, raw material available, families to be moved, and the effect of site acquisitions on the national food program. Through its field forces, organized into State and County War Boards, it relieved the combat units of many of the difficulties incident to land purchase and family relocation.

AIDING FARMERS IN FACTORY AREAS

The Department of Agriculture has undertaken to instruct the farmers in the area of the plants of the War Department and its method of procedure. Such educational work has been particularly important in areas where good agricultural lands were the only suitable location for plant sites or training fields. The readiness with which the people surrendered their homes and accepted makeshift arrangements to further the war effort is evidence of the sacrifices that they are ready to make to preserve their liberty.

Together, the Department of Agriculture and the Corps of Engineers have worked out schedules of dates for surrender of property and integrated them with a program for relocating the families, and caring for and disposing of the livestock and farm machinery. Wherever possible, the two Departments have completed schedules for harvesting crops. Stored feed has been removed and salvaged. Buildings not required by the War Department were sold to the displaced families at salvage value to enable them to build anew in neighboring areas. The salvaged lumber, stanchions, plumbing material, and poultry equipments made new homes possible in spite of increasingly stringent priorities.

Within the Department, many agencies contributed to the program. The Extension Service conducted the educational work. The Bureau of Agricultural Economics surveyed needs of families living on war sites, and provided information to the "action" agencies concerning the types of assistance required. The Farm Security Administration made loans and grants to needy families. The Soil Conservation Service advised farmers as to the location and quality of available farms. The Farm Credit Administration also supplied information on available farms and values. The County Agricultural War Boards assisted in developing the removal program and gave general supervision to the entire program of aid to displaced farmers.

This work was on the "must" program because it required the utmost speed and affected a large number of people. It represented a major

adjustment for many of the old, the poor, and the underemployed. More than two-thirds of the displaced families wanted to relocate on farms—usually as near as possible to their former location. Some of them retired and moved to town, and some found employment in construction and operation of the war plants.

Two examples will illustrate more concretely some of the services rendered by the Department: An eastern area taken over in the expansion of proving grounds was occupied by 73 families. Technicians of the Bureau of Agricultural Economics visited each family and jotted down information concerning the specific help required. Other agencies of the Department undertook responsibility for aiding those particular families which each could help most effectively. Within 2 months, all 73 families had left the area and nearly all had relocated on farms or found other jobs.

The Army took over a National Guard camp in a northern State, and planned to enlarge it considerably. Residents of the area feared an area of good agricultural land might be taken out of cultivation. Accordingly, the local agricultural-planning committee furnished data on types of land in the county, which enabled the Army to acquire land less suited to farming.

The armed forces have carried out the entire program of site selection and acquisition in a manner which demonstrated the fact that even in the stress of war they can be considerate and can cooperate in a democratic approach to major problems. Nevertheless, this program inevitably has had a great impact on American agriculture and will continue to affect it even after the war.

Although some of the large new factories have been built in areas which had the greatest number of unemployed in 1939, many of them are specialized war plants that must be closed when peace comes. Many of the little factories that supported smaller cities and villages and employed youth from the farms are now closed because priorities shut off their raw materials and they did not get subcontracts for war production. On the other hand, some plants built for war uses may continue after the war. For example, those producing anhydrous ammonia may be converted into fertilizer plants.

The construction and operation of military establishments and ordnance plants have created farm labor shortages in adjacent areas. They have provided new local markets for products of intensive farming in truck crops, poultry and eggs, and dairy products.

Flood Control Through Land Work

The Department has a flood-control job to do in wartime. It finds the problem of controlling floods more urgent than ever. Floods are not exclusively a peacetime phenomenon, but a perennial source of property damage and loss of life. With millions of people and the Nation's resources predominantly devoted to one purpose, the damages and the interruptions to the war effort that result from floods are a serious handicap.

Floods from the heavy spring and summer rains of 1942 disrupted transportation, caused injuries and deaths, and affected important industrial and agricultural facilities. Slides along the Lehigh River in Pennsylvania delayed the rail movement of strategic war materials. Flood waters on the Lackawanna and Susquehanna Rivers damaged steel mills and valuable bottom-land farms. Flood waters through the city of San Rafael, Calif., broke levees, halted military movements, caused stoppages of railroad traffic, and prevented essential war workers from reaching their employment.

Basic causes of floods cannot be corrected overnight, no matter how pressing the emergencies. Immediate measures, even if satisfactory for the time being, are often only a temporary answer to the problem. This is because Nature's recuperative soil- and plant-building processes require their own time to heal watersheds that have been abused.

Man's conscious efforts can only encourage and stimulate these processes; there is no successful way of short-cutting them. To make our efforts most effective, we need a thorough understanding of the original causes of the flood damage, of the land use activities that have aggravated them, and of the means available for lessening the bad effects.

The Department's wartime flood-control problem is how to meet our war goals with the minimum of waste of watershed resources. Flood-control work has therefore an emergency and a permanent value. Neither should be neglected.

The relation between flood losses and the way in which land is used is complex. But in a significant number of watersheds it is clear enough to strengthen our confidences that land treatments can lessen flood and sediment losses upstream and increase the efficiency of downstream flood control. Engineers who design large-scale flood-protection works appreciate the need for proper land use on the watersheds above these works. They point to sedimentation rates in reservoirs throughout the country. Small reservoirs have in several instances practically lost their capacity overnight because of sediment from eroding uplands. Even the capacities of large structures, such as the Elephant Butte reservoir on the Rio Grande, and the Salt River irrigation system in Arizona have been seriously reduced in the space of comparatively few years.

The Department is pressing forward its watershed flood-control investigations and making plans to help protect strategically important agricultural areas, industrial sites, and military installations. Low-cost measures, such as debris basins, channel barriers, road bank stabilization, intensified fire protection, and reseeding of denuded mountain slopes, are among the quick means available. Surveys have been made and programs prepared to safeguard flood-plain communities and engineering structures threatened by sedimentation damage. These long-time programs, when put into effect, will promote the proper development and good permanent management of critically important watersheds.

There is the El Paso-Hudspeth project in Texas. This is in an arid area of excessively high run-off. Water and debris flows have covered an arterial highway, blocked the main line of the railroad, and deposited unfertile material on irrigation croplands of high value. The proposed emergency program provides for water-detention dams and watershed management measures, primarily grazing control, and the retirement of eroded croplands.

Another is the San Diego project in Southern California; it involves two vital defense features: The protection of war industry plants and the safeguarding of their water supply. Emergency measures include the reseeding of denuded watershed lands and intensification of fire control to forestall damage by debris to these war facilities.

Surveys have been completed on the Little Tallahatchie and Washita watersheds. The Little Tallahatchie watershed in north-central Mississippi, includes nearly 900,000 acres above the recently completely Sardis flood-control reservoir. Average annual flood damages, directly attributable to misuse of uplands, amount to nearly $1,200,000.

COMPREHENSIVE TREATMENT NECESSARY

The program involves the comprehensive treatment and management of worn-out and badly eroding crop, pasture, and forest lands. Expected average annual benefits amount to nearly $1,163,000, of which flood-reduction benefits alone amount to nearly $350,000. The estimated total monetary benefits from each dollar of expenditure will amount to $2.50, while the evaluated flood-reduction benefits per dollar of Federal cost will amount to $2.45.

The Washita River watershed in Oklahoma and Texas, an area of over 5,000,000 acres, is the source of flood damages averaging about $2,300,000 annually. Serious erosion there has depleted most of the uplands. The treatment of this large agricultural area will include crop, pasture, and woodland improvement, land adjustments, and the acquisition of submarginal farm lands. It is expected to produce total benefits of over $5,000,000 annually; the direct flood-reduction benefits will probably amount to about $407,000. These estimated benefits will amount, respectively, to $4.01 per dollar of total cost and $1.53 per dollar of Federal cost.

The project will protect against sedimentation of such existing engineering structures as the important Denison flood-control reservoir on the Red River. It will protect flood-plain farms from flooding and siltation, and upland farms from excessive losses of soil and water.

Conservation in Wartime

This is an historic year for conservation. It faces the modern conservation movement with the severest test of its rather short existence. Conservation as hoarding, scrimping, saving up, or "putting aside for a rainy day" has no place in wartime. In that sense it is a drag on our productive machinery. In wartime we have to draw on our stored productive capacity—on the fertility of our fields, the wealth of our forests, the power of our streams, and the natural bounty of our lands.

What we need today is productive conservation to help us produce more and produce it more efficiently. Our conservation program must be adaptable to the needs of the hour, or we must make it so. Conservation must take an aggressive role in the war effort. It is not merely a peacetime philosophy, but embodies principles of careful land use and efficient land management that are important in war.

Soil conservation in the United States has been geared to the job of war production through many activities that aid and supplement one another. In some localities the AAA conservation work would not succeed without the technical help of the Soil Conservation Service. On the other hand, some farmers could not afford to readjust their farm plans, build conservation structures, and apply the other needed measures without the financial help of the AAA. Crop insurance helps because it tides the farmers over bad years and partially maintains their incomes. Conservation requires adequate farm income; the two things are inseparable.

Agriculture's job now is to produce war goods and to keep on producing them. Food, fiber, oils, fur, and timber from the farm are articles of war—like bullets, bombs, and gasoline. Alcohol, timber, linseed oil, cotton, glycerine, and other vital war products come from farms and ranches. Farmers must be able to keep up their war-level production for several years if need be. Plowing and grazing to the limit of the land's capacity, without assurance of being able to do it again next year, the year after, and the year after that, would not be a favorable augury. All-out production for 1 or 2 years, if it impaired our ability to produce for the duration, and for post-war reconstruction, would not be true wartime efficiency.

Fortunately the surest way, the most efficient way, and the easiest way to reach the production goals is also the conservation way.

This will seem contradictory only to persons who think of conservation on the farm as meaning diminished production. In itself it does not mean that. The idea that it does is simply the result of the fact that our agricultural programs have aimed directly or indirectly at securing a proper balance between production and demand in a period characterized by overabundance. But the conservation principle can work efficiently in building production up.

SIX CONSERVATION WAYS TO VICTORY

There are six vitally important ways in which conservation on the farms and ranches of America is shortening the road to victory. They are:

1. Increase of yields from cropland, pasture, forest, and range.
2. Allocation of every acre of land to the production job that suits it best.
3. Elimination of waste in soil, water, fertilizer, seed, and other elements of productive capacity.
4. Increase of the arable area—by the control of erosion, by drainage, by irrigation, or by other proved conservation practices.
5. Assurance that crops will be produced in spite of drought, rainstorms, wind, and snow to the extent that it is possible to protect crops from bad weather.
6. Assurance that the agricultural plant will not break down—that it will be able to produce at top speed, year in and year out, as long as the war lasts.

Yields from all our lands—our croplands, grazing lands, timberlands, and wildlife lands—must be stepped up. The production goals make this essential. They include 8 percent more cotton this year than last year, 8 percent more corn, 10 percent more potatoes, 13 percent more dry beans, 14 percent more hogs, 34 percent more flaxseed, 54 percent more soybeans, 73 percent more dry field peas, 155 percent more peanuts. Labor shortages, machinery shortages, and other obstacles may make the task difficult. Weather may make the results uncertain. Conservation farming can lessen the handicaps and enlarge the out-turn. We cannot plow pastures and rangeland. The good land is already in production. Consequently it must produce more than ever before.

Conservation has given us a head start in this gigantic expansion program. In almost a decade of conservation farming, it has stored up soil fertility which will stand us in good stead. Without the conservation work that has been done, we would have far less chance of meeting the production goals.

Wherever conservation measures have been given a fair test, they have increased yields materially. There is no surer, more practical way to make fields and pastures produce more. In some cases conservation measures have increased corn yields as much as 300 percent; contour cultivation has increased potato yields as much as 44 bushels per acre; and crop rotations have increased cotton yields 400 pounds per acre. In some instances, conservation management of range lands has doubled the calf crop and increased the weight of calves. Everywhere the story is the same—on wheat, tobacco, sheep, fruit crops, hay, milk, woodlands. Increased yields; less effort in plowing; savings in labor, power, feed, and fertilizer.

There is the case of a New Hampshire potato grower who had several years ago installed a complete program of soil and water conservation. Stone fences running up-and-downhill had interfered with farming on the contour. He moved these fences and put the sloping potato fields into contour cultivation, with 10 rows of potatoes between protective strips of hay. Some of the contour hay

strips were more than 1,700 feet long. Yet they did not prevent the use of a tractor-drawn, 2-row cultivator. The farmer installed more than 30,000 feet of terraces and diversion ditches, along with nearly 2,500 feet of protected outlets.

This farmer's potato crop in 1939 averaged 483 bushels to the acre for the 57 acres planted, although rainfall in the area was 3.33 inches below normal. His best crop before he adopted the conservation measures was that of 1936, when the average yield amounted to 407 bushels to the acre on 66 acres. He attributed the increase of 76 bushels per acre in 3 years mainly to the erosion-control program, and reckoned that the increase of 4,332 bushels in his total potato crop was enough to pay for the entire conservation program. In addition he had the value of the permanent improvement to his land. He thought that without this soil conservation work he would soon have lost his farm.

Conservation farming enables farmers to put all their lands to the best uses. Obviously the best cropland should be in crops. Strangely, this does not always happen. Millions of acres of overflow and bottom lands might become some of our best farmland, if properly drained. On thousands of farms, some of the best cropland is in pasture or meadow; it would produce much more in some intensive crop.

Conversely, land that does not produce economic yields in cultivation ought to produce pasture, hay, timber, or wildlife. There is waste in using poor land for growing poor field crops comparable with the waste involved in using good croplands for some less valuable purpose. It is important in wartime to have a selective use of land as the counterpart of the selective use of manpower. Fields as well as factories should be at the war jobs they can do best, and conservation methods point the way.

The Soil Conservation Service has developed a plan for classifying land by its ability to produce different kinds of crops under different types of use. It determines the slope, the soil type, the degree and nature of erosion damage, the susceptibility of the land to erosion, and the other physical characteristics of every acre on a farm. On this basis, it groups different parcels of land with similar characteristics into eight capability classes which range from lands suitable for intensive use to lands that are not suitable for any production. Classifying land in this way provides a basis to organize farms and ranches for sustained high production. Cultivated crops for the best land, close-growing crops and pasture for lands less suitable for row crops, and pasture, timber, or wildlife production for lands not suited to row crops or pasture make up the general pattern.

Conservation aims to prevent such waste as soil erosion and loss of moisture through excessive run-off. Contour cultivation, strip cropping, terracing, stubble-mulch farming, are important means. They hold soil and therefore also hold soil fertility, fertilizer, and seed. Soil erosion, one of the greatest sources of agricultural waste, has a close second in lost rainfall. Conservation practices can and do reduce this loss. Coordinated soil and water conservation will stop soil losses entirely on some types of agricultural land, and most

of the water loss as well. It will reduce the wastage materially wherever the land operator follows it conscientiously.

Silting and silted reservoirs, drainage ditches, irrigation ditches, and stream channels, are signs of the need for conservation practices. Some 46 Civilian Conservation Corps camps have been engaged for 7 years in drainage improvements, as part of the Soil Conservation program. This work has taken some 70 million cubic yards of washed-in soil material from drainage ditches. The area of channels cleared and cleaned of obstructive brush and silt amounts to more than 8,000 acres. These cleaning-up operations have returned to use or improved 1,000,000 acres of crop and pasture lands. Yet the work can be said to have made scarcely more than a start, in view of the problem ahead.

Land in trees, land in wildlife production, land in soil-building crops, is contributing to the war effort. Such land is not idle. Hay crops in the draws, stock-water dams in the gullies, field borders for wildlife production, terrace water directed into fish ponds, add up to more production. This country needs furs for fur-lined gloves, fur-lined flying suits, fur-lined caps and boots for the fighting forces. Normally, it imports about half of its fur supply, largely from Canada. But it depends on overseas sources for a considerable quantity. About 70 percent of our own wild-fur production comes from farms. As war increases the demand and at the same time reduces the overseas imports, farmers must multiply their fur production.

MISTAKES IN WORLD WAR I

The United States was in the last war only 19 months, but it used millions of acres of farm and ranch lands so unwisely they have not fully recovered. That was a mistake we cannot afford to repeat. Four or five years of abuse might seriously impair our farm plant. Thanks to the efforts of the soil and water conservation forces, which include Federal and State agencies, hosts of cooperating farmers, and soil conservation districts, we do not run that risk today. We have learned how to use the land and keep it good—how to make it produce more by taking better care of it. Thousands of farmers have soil problems, large and small, that they cannot solve completely without technical aid. But the Department is assisting these farmers in dealing with their problems of erosion, land classification, and water management, with the result that our farms and ranches are much better prepared for war in 1942 than they were a few years ago.

Every inch of topsoil washed or blown away now means decreased yields from now on. We cannot afford production methods that might get results this year at the risk of failure a year or so later. Perhaps the war will last for several years; moreover, we shall have to continue running our agricultural plant at capacity for a while when the fighting stops, so as to help in feeding and rebuilding war-torn countries. Ability and ingenuity will be necessary to keep the plant in top condition, at the peak of efficiency, and with wear and tear minimized. It is a task for conservationists.

Land Use Planning

In 1938, under an agreement signed at Mount Weather, Va., by committees of this Department and of the land-grant colleges, cooperative land-use planning came into existence as a Federal-State program. It spread to 47 States and to more than two-thirds of our agricultural counties. Originally designed to unify national, regional, and local farm interests in land use planning, the program came to include other objectives such as economy and efficiency in policies to promote rural well-being generally, and at the same time to maintain democratic processes in agricultural policy making under rapidly changing conditions.

Four objectives were outstanding: (1) Coordinating interrelated phases of the agricultural program; (2) coordinating local, State, and Federal land use activities; (3) developing an improved working relationship between this Department and the State agricultural colleges; and (4) providing for democratic farmer participation in the development of farm policies and programs. The State, county, and community committees were formed to promote these objectives. These committees included farm men and women and representatives of Federal and State agencies. Knowledge developed by committees helped in the so-called national-defense period and in the early stages of the war effort.

In June last, however, as the Nation shaped its activities more directly to the tasks of war, the Congress eliminated funds for maintaining State representatives of the Bureau of Agricultural Economics in the cooperative land use planning system. Hence the Department's formal participation in the program came to an end. In some States the planning committees continued to function under the leadership of the State extension services and of farm people; but the coordination of Federal with State representatives for action in this field must depend hereafter on other means.

Community committees, made up entirely of farm men and women, provided the foundation for the cooperative land use planning work. Representatives of these committees served on county planning committees, jointly with State agricultural technicians and local administrators of Department programs. There were also State committees, composed of representative farm men and women from each type-of-farming area in the States, together with technicians and program administrators. The directors of Extension were chairmen of the State committees, and State representatives of the BAE served as secretaries.

Operations of the national agricultural programs started after 1933 revealed a need for farmer participation in coordinating national with local objectives; for the better integration of Federal, State, and local

agricultural activities; and for continuously clear working relationships, especially in Nation-wide farm programs, between the Department of Agriculture and the State colleges of agriculture. In less than 4 years the system covered more than 2,200 counties, brought about the organization of more than 10,000 community committees, and enlisted the active help of more than 125,000 farm men and women.

Early in 1941, the State and local planning committees shifted their emphasis to wartime needs. Previous work which they had done in mapping different land use areas and in formulating recommendations as to long-time desirable land uses, had an immediate defense application. It was ground work for cooperation with defense and war agencies. It proved especially useful in choosing locations for industrial plants, Army camps, munitions dumps, artillery ranges, and the like. Also it indicated areas where new cropland could be had if needed, and areas where more intensive crop uses would be desirable. Conversely, by indicating possible shifts of existing plowland to Food for Freedom uses, it helped to prevent the plowing up of needless additional acreage.

WAR RECOMMENDATIONS IN 1941

In the latter part of 1941 and the early part of 1942, the State agricultural planning committees developed their war recommendations. These recommendations, which the Department had requested, indicated how agriculture could best contribute to wartime needs, how war activities could bring about desirable changes in farming, forestry, and rural life, and how undesirable land uses could be checked. The recommendations also dealt with problems of farm labor requirements, health, nutrition, education, forest and range needs, water facilities, surplus distribution, maintenance of family-sized farms, and post-war planning to smooth the transition to peace.

Local problems, which formerly had chiefly occupied the committees, gave way to the problem of war production. Attention centered on efforts to assist State and County War Boards in analyzing production capabilities, and in surmounting obstacles to full production. The battle for a selective increase in farm production was a battle of many fronts. Getting more milk, eggs, pork, peanuts, and soybeans, while holding other lines of production at unchanged or lower levels, was a problem of a thousand details. Making the required adjustments quickly, with the least possible drain on scarce war materials and in accordance with good land-management practices, demanded an intricate distribution of tasks among different areas and farms.

Land use mapping and classification work previously done by local planning committees helped greatly in this job of breaking down national production goals into goals for States, for smaller areas, and for individual farms. The farmer planning committees met frequently with the USDA War Boards to communicate their information and experience.

The work done by farmers through the planning committees relieved some of the pressure on agriculture technicians. Farmers arranged meetings themselves, took more responsibility for collecting needed

farm information, and devised new forms of cooperation with their neighbors in the war effort. The agricultural planning organization economized the time of county agents, rehabilitation supervisors, vocational teachers, and County War Boards. It enabled farmers to do many important jobs that otherwise might have been left undone or done only at increased county expense. For example, community and county planning committees helped the extension services in carrying on their greatly expanded educational work.

In many States, the community planning committees had every neighborhood represented on them by one or more farm people. This arrangement greatly speeded the exchange of information between farmers and war-agency officials. The State extension services in particular used this two-way information channel. Through it they reached many farmers not reached before through home demonstration clubs, 4–H Clubs, and livestock-improvement clubs, and other group activities. Civilian defense organizations in many States utilized county and community planning committees as a means of reaching farm people.

PLANNING AFTER THE WAR

Adjustments after the war will be as difficult as those we are making now. The planning committees, long before Pearl Harbor, analyzed impacts of the war on agriculture, and began to plan for post-war action. The need for agricultural planning is not new, nor is it temporary. It properly looks ahead to the post-war period, because planning for that is one way to make the immediate war effort more effective as well as to cushion the shocks of post-war adjustment. There is no greater drag on the farm war effort than dread of what may follow it. Obviously, moreover, the solution of long-time problems, such as flood control, farm tenancy, tax delinquency, reforestation, production adjustments, soil erosion, marketing, credit, etc., requires group action. Such problems cannot be dealt with by farmers individually, but require group planning and action.

How the planning shall be done, and by whom, is a primary question. Perhaps it could be done by technicians and program administrators alone, or by particular groups of farmers alone, without bringing the voice of the whole people to bear in formulation of policies and action. But both of these alternatives seem inconsistent with the long-time welfare of democracy. The planning that is necessary should develop as a democratic combination of scientific and lay judgments, based on understanding and approval by the whole community.

Services to the Armed Forces

Besides helping agriculture to produce Food for Freedom, the Department carries on many other activities that have military value.

For example, as a result of its research, smokeless powder for use in firing big guns and in antiaircraft shells and rifle ammunition may now be made from staple cotton as well as cotton linters. Linters are the short, fuzzy fibers removed from cottonseed after ginning has removed the longer fibers. Though they are specially adapted to nitrating for gunpowder, the supply of linters is insufficient to meet our needs.

Scientists have demonstrated that good-quality, clean cotton fiber, when cut to a suitable length, is just as good as linters. They have designed machines for cutting the cotton fiber, and some of the machines have been built. The new source of material provided by the cutting process will obviate drawing on materials, such as for cellulose acetate rayon, cellulose acetate plastics, and nitrocellulose lacquers, which may be required for other purposes.

Chemists in the Department have developed a new process for mildew-proofing cotton and other fabrics. The Army is using it on tents, tarpaulins, and sandbags. Nontoxic and comparatively inexpensive, the process gives treated fabrics the same appearance as the untreated, and remains effective even after fabrics so treated have undergone repeated washings and months of storage.

Research in the Department is contributing to the armed forces also in the use of naval stores products in flame-thrower fuels and rosin oils for gas masks for animals. Other findings encompass dyes for smoke screens, tung-oil supplements, substitutes for domestic vegetable oils, textile-fiber substitutes, cork and leather substitutes, and improvement of shipping containers. Since the Army marches on leather, the Department is working on methods of making leather footwear more resistant to water, and developing substitutes for imported hides, skins, leathers, and tanning materials.

Foresters are studying the potentialities of natural wood, wood plastic, plywood, and impregnated and compressed wood for use in aircraft fuselages, spars, and scarf joints and in torpedo boats and other naval auxiliary units. They are developing from wood pulp a high yield and quality of alpha cellulose for direct nitration into explosives. Studies have developed and tested high-density wood charcoal and special filter papers for gas masks, accelerated drying schedules for lumber for aircraft stock, and wood lignin compounds for antiknock use in gasoline. They have indicated improved means of bending oak for ship construction.

Other war research in the Department deals with mustard gas decontaminants; with tannin materials; and with the production of scarce drugs, such as morphine. The need to conserve tin has prompted search for other container materials and other methods of preserving foods.

Chemists and engineers in the Department have developed a process for getting root starch from sweetpotatoes, which helps to fill the gap caused by the let-down in our imports of tapioca starch from the Far East. As a substitute for unavailable imports, they have developed a hard wax derived as a byproduct of cane-sugar production; it is useful in treating naval cordage and fiber flax.

From soybeans and other domestic vegetable oils the Department has produced rubber extenders—materials that can be added to natural or synthetic rubber without affecting its properties. Department research has found methods of getting industrial alcohol and butylene glycol from such agricultural raw materials as corn and wheat. Butylene glycol, besides being important in producing synthetic rubber, answers many of the present uses of glycerine. The Department's scientists have developed penicillin, an antiseptic, from agricultural raw materials.

MILITARY-AID WORK MANY-SIDED

Meat-inspection activities have broad military use; so have the Department's services on methods of preparing and packing meats and meat-food products. Studies of animal fibers have helped to increase the supply of fleece-lined coats for the military services. For example, these studies have shown the proper length of fleece which the pelts should carry. Animal husbandry experts are cooperating with the War Department in safeguarding the health of Army horses and mules. They are supervising the cleaning and disinfection of yards, premises, cars, and other equipment used in handling Army animals.

The Department's map-making facilities have been of considerable assistance to the Army and Navy. Through photographic maps already made by the Agricultural Adjustment Agency, Soil Conservation Service, and Forest Service, through additional mapping with emphasis on areas of strategic military value, and through its laboratory services, the Department has helped to place a complete detailed picture from coast to coast at the disposal of the military authorities. Engineering personnel and facilities of the Forest Service have assisted the Army Corps of Engineers in some special topographic mapping.

In parachute work the Army has leaned heavily on the Forest Service, and is using its findings with regard to the dropping of supplies and personnel. It has found important uses for the Department's information on "brush buster" bulldozers, "sno-motors," and power saws. Its radio and telephone communication units, coordinated with Army facilities, are helping to serve lookout and guard stations.

Some of the Department's regular services have also complemented military operations. For example, land treatments for flood control have involved the construction of fire-prevention and fire-suppression facilities, the seeding of burned areas, up-stream-channel improvements, and the stabilization of road banks by engineering and planting measures. Such operations, which have been necessary for peacetime reasons on many watersheds, have also proved an advance preparation for military work, since it is not always possible to avoid locating Army camps and munitions plants in flood-hazard zones.

Findings of Experiment Stations

Findings of the agricultural experiment stations, in research projects coordinated through arrangements with this Department's Office of Experiment Stations, have promoted the war effort in scores of ways, especially in the techniques of farm production. The following examples give some idea of the variety and practical value of the results:

In some areas of the South bitterweed is a serious pasture pest. Large-scale expansion of the manufacture of cheese and dried milk in such areas may require eradication of the weed or the elimination of the bitter flavor it gives to milk. The Mississippi station has developed a quantitative test which should permit the use in manufacturing of much milk which would otherwise be unsalable. The test gives an accurate measure of the bitter principle. Milk is bubbled through chloroform, which is then evaporated in the presence of water. A color reaction which denotes the intensity of the bitter principle is secured by using picric acid and sodium hydroxide. The Mississippi station finds that a certain amount of the bitter principle can be retained in cheese and other manufactured products while a greater percentage is objectionable. Milk containing too much bitter flavor may be diluted with nonbitter milk.

Cottonseed meal has been a cheap and constantly available source of high-protein feed for livestock but has been fed only sparingly to hogs and chickens because of frequent cases of poisoning. Both the Alabama and Texas stations have traced the toxic properties of certain cottonseed meals to their content of free gossypol.

The Alabama station, in a study of cottonseed meals from 16 commercial mills, found total gossypol rather uniform whereas free gossypol was three or four times as high in some meals as in others. Feeding tests with rats, chickens, and hogs showed toxic effects to be definitely related to the free gossypol content.

The station found that toxicity could be alleviated by heat treatments, which are adaptable to practical use. Work with processing methods at the mills indicated temperature and length of the cooking process to be the major determinants of free gossypol left in the meal. Using experimental laboratory equipment and different processing methods, the Texas station has been able from the same lot of seed to produce cottonseed meals that show wide variations in toxicity when fed to guinea pigs.

Large rejections of cream for butter making during the summer months because of high mold content prompted a study by the Indiana station of methods that might be used to retard mold growth or eliminate mold mycelia from cream. Practically all sour cream used for butter making contains some mold, and the producers' problem is

largely one of retarding the growth of mold in the cream. The problem is especially important in the South and central midwestern States where cream is seldom marketed more than twice a week and where cooling facilities are often lacking. Butter containing more than 60 mold mycelia is subject to seizure by Federal Food and Drug inspectors and by most State food inspectors. Repeated trials by the station have shown that stirring the cream twice a day greatly retards the growth of mold. Abundance of oxygen on the surface of the cream permits rapid growth of mold, and the removal of the mold from the surface to lower layers of cream where there is less oxygen retards the growth.

Large quantities of farm butter and creamery butter are either rejected or sold as second-grade due to undesirable flavor. The Indiana station has traced difficulty in that State to the water used in washing the butter. In many cases the water contained organisms capable of destroying the natural flavor and producing a cheesy or rancid-flavored butter. Checking the water supplies of creameries in different parts of the State gave evidence of wide distribution of these organisms in Indiana.

Analysis of existing milk-delivery systems in towns and cities by the New York (Cornell) station revealed that in retail delivery, because of route duplication, the total route mileage averaged three to four times as great as the minimum mileages that would have to be covered if only one delivery vehicle were used in an area. A switch from every-day to alternate-day delivery would save approximately 38 percent in both time and truck mileage. On the basis of these findings schemes for route simplification have been developed.

The California station reports that fermentation byproducts, such as distillers' solubles, can be used as practical substitutes for dried milk as riboflavin carriers in poultry feed at a saving of about one-half in the cost per unit of riboflavin. It found soybean meal to be deficient in methionine and lysine, but capable when supplemented by these amino acids of promoting excellent chick growth. The Maryland station finds that good hatchability can be obtained by feeding mashes containing soybean meal and fish meal as the only protein supplements, with a butyl fermentation residue included to supply water-soluble vitamins, provided the hens receive good-quality alfalfa leaf meal as 5 percent of the diet.

The insecticide industry has used from 5 to 10 million pounds of sodium fluoride annually, but the war has cut the supply in half. Over 50 percent came formerly from Germany, Netherlands, and Denmark. Formerly used to the extent of 50 to 100 percent in roach powders, sodium fluoride is now in demand for processing steel and in making aviation fuel. The Tennessee station has developed an insecticide formula which requires a much smaller percentage of sodium fluoride. An activator renders the chemical more effective. Nonpoisonous and safe to use in the home, the formula promises to be a boon to the pest-control industry.

Efficient application of fertilizer is difficult, particularly on sandy soils. Applying too much fertilizer close to the roots may injure plants. Placing the fertilizer too far away causes loss from leaching. Research

with sweetpotatoes at the New Jersey station over a 3-year period has favored liquid applications. In one test a yield of 325 bushels was obtained with 100 pounds of 5–13–7 fertilizer in water, compared to 246 bushels with 1,200 pounds of 3–8–10 applied dry. In another experiment the best dry treatment yielded 328 bushels and the best liquid treatment, although it contained but half the quantity of nutrients, yielded 354 bushels. These results have importance in the war emergency because of the need to economize on use of fertilizer materials.

Demand for seed of grasses and forage crops has increased due to the virtual elimination of imported stocks. The Pennsylvania station has found that infra-red radiant energy offers a rapid and safe method of drying such seed. This finding may be of considerable importance in the effort to produce seed in the United States. Low germination is a major problem. Some seeds lose their viability rapidly if stored with a high moisture content at temperatures above 70° F. Such seeds as red fescue, tall fescue, bromegrass, and ryegrass, the Pennsylvania station reports, can be dried to the safe moisture content of 10 percent in from 2 to 5 minutes with infra-red lamps.

Winter wheats resistent to hessian fly and the rust, smut, and mosaic diseases common to the soft red winter wheat area have been obtained by the Indiana station and this Department. In 1925 high resistance to hessian fly was discovered in some spring wheats grown in the nursery at Lafayette. Crosses of fly-resistant spring wheats with some disease-resistant soft red winter wheats adapted to the region resulted in selections of winter wheats which combined both fly and disease resistance. They are of promising grain quality. In 1941, when no hessian fly was present in the region, they yielded as well as the old standard varieties. Under the severe hessian fly outbreak of 1942, which destroyed much wheat in Indiana, these resistant strains were practically unaffected by the hessian fly. Nearby common varieties were almost 100 percent infested. Indiana farmers grow approximately 1,500,000 acres of soft winter wheat annually.

The North Carolina station has offered definite recommendations for peanut seed treatments. Tests have indicated that large savings may be realized by controlling root rots with seed treatments. The treatments permit the use of machine-shelled seed for transplanting and save about one-third in the amount of seed needed by giving assurance of a uniform stand. Outstanding increases in the emergence of peanuts were obtained when seed was treated with dust materials, such as organic sulfur, organic mercuries, Spergon, and chemically hydrated lime. Annual savings of approximately $500,000 in North Carolina are believed possible from the general adoption of such treatments.

Experiments at the New York State station have indicated the effectiveness of fungicides which might be used as seed treatments to protect commercial canning crops against seed decay, damping off, and root rot. Many compounds tested have been eliminated either because they do not give adequate protection against these diseases or because they are toxic. Some chemicals, such as some copper and mercury compounds and certain new organics, are highly effective.

Of particular interest is the organic compound Spergon (tetrachloro-para-benzoquinone). It has proved to be an effective fungicide, and also has the ability to stimulate plant growth by hormone action. Treatments with this material gave yield increases of 799 pounds per acre of canning peas in 1940 and 470 pounds in 1941. At current prices such increases amount to $28 and $16 an acre from a 70-cent investment in materials.

Recommendations for soft rot control in sweetpotatoes have been aimed heretofore at reducing losses during storage. Adequate measures have not been generally available to control this disease after the potatoes have been removed from storage. In some years soft rot has destroyed 50 percent of the New Jersey crop in the period between its removal from storage and its sale. Experiments by the New Jersey station have produced an inexpensive mixture of borax, emulsified oil, and water, which has been found highly useful as a protective dip. In some cases it effects a reduction in the loss from as high as 50 percent to less than 2 percent.

Blackening of potatoes which often occurs after cooking can be greatly reduced or entirely prevented by storing potatoes at 100° F. for 3 or 4 days immediately after digging and then removing them to normal storage. This is a finding of the New York (Cornell) station. After such treatment, the tubers remain in good edible condition. Potatoes subjected to relatively high soil temperature before digging undergo essentially the same reaction. Little or no blackening occurred in samples of potatoes which matured in the station's trials at mean temperatures of 70° or above, whereas samples which matured at 60° or below usually blackened after cooking. The decreased tendency toward blackening is believed to be due to an accumulation of organic acids which increase the acidity of the tuber. Blackening was decreased when potatoes were boiled in acid solutions and in most cases was increased by boiling in alkaline solutions.

Agricultural Chemistry and Engineering

Since importation of vegetable oils is greatly curtailed by the war, it is important that substitutes be obtained from domestic oils and fats by fractionation or chemical modification. It is also important that as much oil as possible be extracted from available materials, including those that have been utilized little or not at all in the past. Many chemical and engineering investigations in the Department are directed toward these ends.

For example, relatively simple equipment has been designed in the Bureau of Agricultural Chemistry and Engineering for use by cottonseed-oil mills for recovery of the residual oil in press cake. Important results have been obtained on the modification of cottonseed oil to obtain a product that can replace palm oil in the process of tin plating. It was found also that a product suitable for replacing inedible olive oil in the textile-finishing industry can be obtained from peanut oil.

Carelessness in handling and storing tung fruits between harvesting and processing results in poor quality and reduced recovery of oil. Treatment of the undried fruits with a 1:1,000 mixture of ethylene gas and air facilitated hulling more than the steam treatment. Artificial partial drying of the ground, decorticated tung nuts made it possible to obtain a press cake containing only 3.5 percent of oil, 1 percent less than usual. A solvent extraction process has been developed for the recovery of residual oil in press cake, or, preferably, for the extraction of suitably ground tung nuts with practically no loss of oil.

Progress has been made in efforts to obtain tung-oil supplements and substitutes from domestic vegetable oils. Soybean oil has been separated into fractions, very high to very low or negative in drying power. A selective-solvents process is promising. The fractions having high drying power are suitable as substitutes for linseed oil and those with low drying power are better for use in food products than the original oil. A product obtained by heat treatment of the principal component of gum spirits of turpentine was found to have pronounced drying properties, suggesting it might be used to promote oxidation of oils in paints and varnishes.

Recent results indicate small quantities of compounds closely related to vitamin C may retard rancidity of lard and other edible fats and oils. One of the materials being used in this work is produced commercially from 2-ketogluconic acid, made commercially by fermentation of corn sugar under a patented process developed in this Department. It has proved excellent and safe for retarding deterioration of certain foods and beverages.

The shortage in vegetable waxes needed for increasing wear and water resistance of leather, wood, and some textiles may be relieved

in part with wax recovered from the "muds" of sugar refineries. A process for extracting and refining wax from this source, with recovery of useful byproducts, is now in the pilot-plant stage and will probably be applied commercially. Some promising synthetic waxes have been made from peanut oil and certain alcohols.

WORK ON FIBERS, PLASTICS, AND STARCHES

Substitutes for wool are badly needed. Artificial fibers that may be blended with wool for clothing fabrics and with fur or hair for felt are made commercially from casein. Studies in the Department look toward the improvement of casein fibers and the production of wool substitutes from substances other than casein, much needed for cheese. Several chemical derivatives of casein, one with as much sulfur as wool, have been prepared.

Fibers have been made from soybean protein, but they were somewhat weaker than those made from casein. The difference can probably be made up by modifying the soybean protein. Equal parts of soybean protein and casein have yielded fibers nearly as strong as those of casein alone. Cottonseed meal is receiving attention as a possible source of protein for fibers and other uses. Experiments on commercial peanut meals show that 80 percent of the protein can be extracted with dilute alkali. Coating compositions, for imparting to paper the smooth, glossy surface required for halftone engraving, were prepared in the laboratory with soybean protein instead of the usual casein and applied with satisfactory results.

The value of soybean protein in plastices was improved by chemical treatments which altered the structure and reduced water absorption. Ways have been found to make zein, the alcohol-soluble protein of corn, more useful in coating compositions as a substitute for casein, shellac, and cellulose compounds. The tendency of zein solutions to gel on standing, and of zein films to become opaque on wetting, long stood in the way of their industrial utilization as coating materials, but simple methods have been found by the Department for overcoming these difficulties.

Imports of cassava and other tropical starches have been cut off, and there is need for domestic root starches or other starches so modified as to serve the same purposes. The Department's chemical technologists and engineers have been instrumental in starting the sweetpotato starch industry. They are trying to lower the cost of producing the sweetpotatoes by developing efficient planting and harvesting machines and improving the process and processing equipment. The starch obtained from so-called waxy corn has been found to be similar to tapioca in some of its properties, and dextrines made from the starches of waxy corn and waxy grain sorghum have compared well with commercial tapioca dextrin as adhesives. Studies of potato starch and dextrin also indicate that potato dextrin can be made which is a satisfactory substitute for tapioca dextrin. An improved dextrinization process has been developed. Apparently the way is open to make the United States nearly self-sufficient in root starches.

RESEARCH WIDENS USES FOR MANY PRODUCTS

Imported water-soluble gums, such as tragacanth, acacia, and karaya, are used extensively as emulsifying and thickening agents in industrial processes, food, and pharmaceuticals. Now substitutes must be found. Experiments show a promising substitute in certain cases is pectin. Because of the purity and uniformity of pectin it is likely to be more satisfactory than the natural gums, especially in foods. Dextrin from grain starches can fill in for some of the natural gums, especially acacia.

Substitutes are also needed for shellac and other imported natural resins. Scientists found a substitute for shellac as coating material in specially prepared alcoholic dispersions of zein, a protein from corn.

Many synthetic resinous materials are commercially available for use as plastics for molded and laminated articles. In the Department excellent molding powders have been prepared which contain 50 percent of modified soybean meal, 35 percent of commercial phenolic resin, and 15 percent of wood flour. This formulation effects substantial saving in phenol, which has important war uses. Zein, the corn protein already mentioned, has also been improved as a material for plastics; a molding powder made with modified zein yielded molded objects which absorbed only 5 percent of water during a 24-hour immersion and were not damaged in color and strength.

The United States must still depend largely on imports for tanning materials, mostly from South America. The increased need for leather for army shoes and other military uses makes it important to have available hides and skins go as far as possible. Much information has been acquired in the Department's past research on hides and skins, and more research has been done recently.

For several years data have been acquired on the possibilities of growing canaigre root and a high-tannin-containing species of sumac for use in preparing tanning extract. Data have also been acquired on the value of western hemlock and Sitka spruce barks for the manufacture of tanning extracts, and the Department has suggested that a stock pile of these waste barks from Pacific coast lumber and pulp mills be accumulated.

Since metallic chromium is a strategic material for war industries, it is necessary that chromium compounds for so-called chrome tanning be replaced so far as possible. A combination iron and chromium tanning process developed in this Department some years ago makes it possible to save much chromium and yet obtain satisfactory leather. Alum-retanned vegetable leathers have been shown to have properties which make them satisfactory substitutes for chrome leathers for some purposes.

FOOD-PRESERVATION METHODS

Quick freezing and freezing storage of food is expanding rapidly. In spite of certain limitations, frozen foods are practical for a large part of the civilian population, for some Army camps in this country, and for some naval vessels. At the Department's Western Regional

Research Laboratory investigations are in progress on the application of this method to fruits, vegetables, and poultry products.

Frozen purees of good quality have been prepared from fruits and vegetables which, because of imperfections, would have been graded as second-class in fresh-fruit and vegetable markets. Freezing preservation has also been applied experimentally to dressed poultry, to cut-up poultry meat, to precooked and boned poultry meat, and to broken-out eggs under conditions selected for maximum retention of quality. Properly frozen poultry, either drawn or undrawn, can be kept in excellent condition for at least 5 months if stored at −20° F.

Application of brining pickling to a wider variety of vegetables would make it possible to save for food uses substantial quantities left after the close of the shipping season for the fresh-vegetable markets. In some localities these vegetables could be preserved in cucumber-pickling plants, and the only equipment required would be wooden fermentation tanks and wooden kegs or barrels. Pickling has already been applied successfully to peppers, okra, cauliflower, onions, tomatoes, and string beans.

The acid pickling process is also applied to the preservation of green corn fodder and forage plants as silage. Recently experiments were started on the use of this method for preserving cull sweetpotatoes (sliced) and sweetpotato vines, with or without the addition of other materials, such as cull apples and green forage plants, as a means of increasing the inadequate supply of winter feed for beef and dairy cattle in the South. Results to date indicate that a satisfactory method of ensiling cull sweetpotatoes and sweetpotato vines can be developed.

ENZYMES AND PROTEINS

Final ripening or curing of grain, the result of enzyme action, can be accelerated by treatment with ethylene gas diluted with several thousand times its volume of air. Experiments with this treatment applied to under-ripe combine-harvested wheat immediately after harvesting made it possible to store a large quantity of the wheat in bins without excessive heating, whereas untreated grain spoiled from bin burning in less than 10 days. When ethylene was applied to shelled corn from freshly harvested ears in the same concentrations and manner as were used with wheat it had practically no effect.

The Department has obtained a public-service patent on a method for promoting the enzyme curing of vanilla beans. This method of curing gives Puerto Rican vanilla an exceptionally high quality. More extensive production of vanilla might prove a good substitute for coffee production, now unprofitable in Puerto Rico.

A public-service patent has also been obtained on a process for the preparation of papain, sometimes used for tenderizing meats. This patent has been dedicated to the Secretary of Agriculture. Papain produced by the new method is more active than present commercial papain and will retain its activity indefinitely. Papain liquefies meat quickly and the meat may be dried to a powder. It should be very useful in some places and under some circumstances. Moreover, certain meats, like liver, that have special nutritional

value but are difficult to keep, could be easily preserved by liquefaction and drying.

A new crystalline sulfur-containing protein discovered by chemists of the Department during recent research on the enzymes of wheat and flour has been isolated in large quantity for distribution to research scientists interested in finding uses for it. This substance, for which the name "purothionin" has been proposed, has been found to be very toxic to yeasts and certain bacteria but harmless to small animals. It is expected to have uses as a food preservative and as a medicinal agent.

Some of the Department's chemical research is intended to relieve the sugar shortage by increasing the supply of sugar or sugar sirup from domestic agricultural crops or by modifying fruit-preservation methods. Pilot-plant experiments on the production of crystallized sugar from sorgo cane indicated the feasibility of developing a commercially practicable process. Thus far, yields up to 175 pounds of dry sugar per ton of sorgo have been obtained, together with about 10 pounds of starch, 4 pounds of aconitic acid, 6 gallons of blackstrap molasses, 1 bushel of seed heads, and 400 pounds of dry bagasse. It is likely that the cost of processing can be largely offset by the income from byproducts.

Attention has been given to problems that bear on the supply of foods to our expeditionary forces and lend-lease shipments of food to our allies. Among these are: The preparation of soluble coffee-sugar tablets which have good flavor and retain it indefinitely; compression of flour to reduce bulk and save shipping and storage space; development of soybean and peanut "milk" powders as protein concentrates for the United Nations; development of a self-preserving concentrated citrus marmalade base; preservation of berries and other noncitrus small fruits in bulk with sulfur dioxide and calcium salts for overseas shipment; improvement in citrus-juice concentrates with regard to retention of vitamins; development of noncitrus-fruit marmalade bases having a high pectin content derived from apple pomace or dried apple chops; and improvement of the processing and packing of canned poultry meat for hospitals and convalescent centers in the tropics.

APPLICATIONS OF AGRICULTURAL ENGINEERING

This season most commercial storages for corn, grain sorghum, wheat, and soybeans are full and much grain must be held on farms. Metal bins which make economical storages cannot be had and wood or other type bins must be used where lumber is available. Engineers in the Department have worked out types of bins for use by the Commodity Credit Corporation in taking care of 400,000,000 bushels of wheat on farms this year; also a method whereby 20,000 of the Corporation's empty metal corn bins were taken apart, shipped by truck 500 miles, and reassembled in the wheat area to provide storage for wheat.

Studies of commercial-fertilizer dispensers show need for improvement to get higher yields with less plant food. Urgent requests from growers and factory men for additional research on

fertilizer placement for sugar beets, cannery peas, and other vegetable crops have resulted in the design and construction in the Department shops of a special fertilizer-pea drill for use in Minnesota; a special vegetable drill for beets, carrots, and spinach in western Washington; and a special side-dressing distributor for use on sugar beets and other crops in Michigan. Deep placement of fertilizer in a plow furrow and application of nutrient-starter solutions on transplanted seedlings are among supplementary treatments expected to yield further increases in fertilizer efficiency and crop yields. The machinery-research men are emphasizing fertilizer work on crops needed most in the war effort.

Conservation of man labor up to 66 percent will be effected with the perfection of a sugar-beet harvester, now nearing that stage. This machine is the final unit needed to complete mechanization of the sugar-beet crop. Practically all operations in sweetpotato production have been mechanized in the Laurel, Miss. area, although there is still need for adapting the procedure to other producing areas. Corn machinery is likewise highly developed although further work is needed on mechanical pickers to reduce field losses and on the development of machinery to pick sweet corn for canning purposes.

Curtailment of castor-bean imports and urgent industrial needs for the oil gave rise to a plan for increasing domestic production of castor beans. This has resulted in the development of a castor-bean huller. Likewise, increased demands have arisen for edible oils. With the increased acreage of peanuts, improved production machinery to better handle the increased demands is necessary. Also the curtailment of sisal imports for binder twine has created a need for substitute twines for grain and corn binders, and to replace wire (a scarce material) in hay balers. Some preliminary tests have been made with different substitute twines in several small-grain and corn-producing areas.

In an experimental and demonstration ginning plant, the Department has obtained much information of practical value to cotton growers and ginners. The result has been better lint cotton, more efficient operation of gins at lower cost, and longer life for the machinery. Equipment and methods have beeen devised that promise to be practicable in obtaining bales of higher density without lowering spinning value. As a further result of this work, mechanical sampling integrated with gin packaging may obviate the need for cutting into bales in the cotton markets. In this work the causes and remedies for compress cutting of cotton have been determined, with a significant decrease in trade penalties and rejections.

Substantial progress has been made by Department engineers in cooperation with Oregon flax growers, in the development of machines and methods for harvesting and processing fiber flax. Among the improvements is a field machine which combines the operations of pulling, deseeding, and seed cleaning; a new scutcher which increases the proportion of line fiber with a corresponding decrease in tangled fiber or tow; and a tow-cleaning machine. Four proposed new flax mills are expected to use the new equipment.

Animal Husbandry

The livestock industry, aided by Department research in production methods and disease control, holds a key position on the food front.

Experiments previously begun with the view of increasing the Nation's livestock resources are now yielding tangible results largely in the form of increased production. This is obtained through better types of animals, improved feeding, and prevention of losses, especially those caused by diseases and parasites. All these activities underlie the efficient and continuous production of the vast quantities of meat and other livestock products so essential to winning the war.

A noteworthy development in cattle raising has been the successful production of types suitable for areas in which the common domestic breeds have not thrived well. For instance, crossing and backcrossing of domestic beef breeds with Brahman cattle have helped to develop cattle suitable for the Gulf coast and other subtropical areas. The strains thus produced are resistant to high temperature and humidity and efficient as beef producers.

In parts of the South and Southeast suitable feeds have been a limiting factor in beef production. Frequently these areas have surpluses of sweetpotatoes. Experiments by the Department and the Georgia Coastal Plain Experiment Station have shown that sweetpotato meal for fattening steers is approximately 75 to 80 percent as efficient as cracked shelled corn and that sweetpotato pulp is about 20 percent as efficient as ground snapped corn. The use of sweetpotato products as feed for cattle in these areas should make it possible to produce a greater quantity of finished beef. Added resources of this kind serve a highly useful wartime need and give promise, also, of lasting benefits under peacetime conditions.

LIVESTOCK DISEASE-CONTROL SERVICES

Veterinary services of the Department, which comprise both laboratory research and field activities, have provided protection against loss and have improved the quality of products. Prevention of brucellosis in cattle by the use of a vaccine developed by the Department is proving highly successful. This disease impairs the production of milk and beef and through infected milk or meat products can be transmitted to man as undulant fever. The preventive vaccine is applied to calves between the ages of 4 and 8 months. Forty-two States are using it under Federal-State supervision. Approximately 147,000 calves have been vaccinated under official supervision since January 1, 1941, when the vaccination method was officially recognized as a practical means of preventing the disease. Many other calves have been vaccinated against the disease by private practitioners.

Up to the end of the 1942 fiscal year, 549 counties in 24 States, including the entire State of North Carolina, had been classified as modified accredited Bang's-disease-free areas. This term signifies that the disease does not exist in more than 1 percent of the cattle of the area, usually a county, nor in more than 5 percent of the herds. Federal and State veterinarians cooperate in establishing such areas. The testing involves all dairy and breeding cattle more than 6 months of age and the slaughter of reactors. Owners of condemned animals receive an indemnity from the State and Federal Governments. At the request of the British Ministry of Agriculture and Fisheries, Department specialists skilled in Bang's disease control visited England and furnished technical advice to the authorities. They also provided cultures for the production of the vaccine. The vaccine is being used extensively to control brucellosis in British herds, with a view to increasing the production of milk and beef.

Progress continues in the eradication of tuberculosis from the cattle herds of the United States, Puerto Rico, the Virgin Islands, and Hawaii. Veterinarians employed by the Federal, State, and County Governments applied nearly 11,000,000 tuberculin tests in the fiscal year 1942. The proportion of reactors was approximately one-fourth of 1 percent—the lowest reported in any year since 1917, when the project began.

Coccidiosis, a disease of cattle as well as of sheep and poultry, results from parasites that invade and destroy the intestinal lining and produce bloody scours. Parasitologists are attacking this disease with sulfur and sulfur-containing compounds. Sulfaguanidine, a drug related to sulfanilimide, checks coccidiosis in livestock and poultry if administered before the disease develops. Ordinary sulfur mixed in the feed controls coccidiosis in sheep confined in feed lots.

SOME RESEARCH FINDINGS

Better breeding herds and more economical growth in pigs are important objects of research at Beltsville Research Center, Beltsville, Md. Danish Landrace hogs are being crossed there with hogs of domestic breeding to combine prolificacy, mothering ability, rapid growth and carcass quality. Other experiments reveal wide differences in the ability of various strains of hogs to make economical gains in weight. The records on about 500 groups show a range in their average daily gain, from weaning to market age, of 0.56 to 1.86 pounds. In these tests the feed required per 100 pounds of gain in live weight ranged from 302 pounds to 512 pounds. Geneticists endeavor to select and develop the favorable inheritance factors.

Study of swine parasites has indicated means of reducing losses, especially among suckling pigs. It has shown, for example, that intestinal threadworms are a greater danger than had been suspected. The larvae of these parasites are carried by the blood not only to the intestines but also to other parts of the body. Many of them localize in the heart muscle, where they produce injuries that frequently kill the pigs. Newborn pigs should be kept on clean lots and pastures,

away from older pigs which may carry the parasites and contaminate pastures.

Early in 1942 the Secretary of War revealed a threatened shortage of the surgical sutures which are prepared from sheep's intestines. Sheep raised in the East, in the South, and in the Middle West commonly have nodular worms, which raise nodules on the intestines and render them useless for surgical sutures and even for sausage casings. Furthermore, the nodular worms injure the health of sheep and lambs and reduce the production of mutton and lamb possibly by as much as 100,000,000 pounds annually. New methods of controlling nodular worm infestation in sheep, based on the Department's research, use treatment with phenothiazine, combined with pasture sanitation. Sheep that have access at all times to a medicated salt which contains phenothiazine make better gains in weight and produce more wool than sheep that have access only to ordinary salt.

Lamb production can be increased by breeding ewes for the first time at 9 or 10 months of age if they are well developed and well nourished, instead of at the usual age of about 18 or 19 months. Experiments with 84 pairs of ewes established this fact. One animal of each pair was bred first at 9 or 10 months of age and the other at 18 or 19 months. In 5 years the former group produced a total of 2,572 pounds more of lambs at weaning time than the latter. Early breeding gave an advantage of about 6 pounds per ewe per year. Average fleece weight per year of the ewes bred as lambs was about one-third pound less than that of the ewes bred first as older animals, but the wool from the extra lambs more than made up for this slight disadvantage.

Although sleeping sickness, or encephalomyelitis, continues to cause losses among horses and mules, preventive vaccination has greatly reduced the toll of this disease, which occurs chiefly during the summer and fall, when farm power is urgently needed. Out of approximately 462,000 animals vaccinated in 1941, only 213 developed the disease. In nonvaccinated horses and mules infection was more than 13 times as great as in vaccinated animals.

It is essential to control internal parasites, such as blood worms in horses and mules, especially in animals required for the Army. Such parasites impair the health of the animals, predispose them to colic, and interfere with their capacity for work. Researches this year have shown that the daily administration, for about 2½ months, of very small quantities of phenothiazine with the feed will gradually diminish the infestation. Moreover, the lethal effects of the phenothiazine on the parasite egg discharged with the droppings prevent the contamination of pastures.

IMPORTATIONS OF BLOODED LIVESTOCK

The United States is continuing to develop as a reservoir of choice blooded livestock. Under the Tariff Act of 1930 pure bred animals enter the country duty free, and in the fiscal year 1942 certificates of pure breeding authorized the importation of 20,247 animals. This number, an all-time record, exceeded by 6 percent the importations

in the fiscal year 1941, which were 27 percent more than those of the preceding year.

The principal gain was in the importation of cattle—notably Holstein-Friesian, Jersey, and Ayrshire, most of them from Canada. Smaller numbers arrived from Mexico, England, Ireland, New Zealand, and other countries. Some horses arrived from South America. The importations of both cattle and horses represented many prominent breeds. These choice imported animals and their progeny will provide means, after the war, for reestablishing herds and flocks in countries that the enemy has pillaged.

Home Economics

In less than a year of participation in the war, families of this country have had to make many adjustments in living habits and use of their money, and many more adjustments lie ahead. Rubber, gasoline, metal, sugar, meat are words with new meaning. Taxation, market supplies, rationing, and other wartime developments have repercussions on family living. The Bureau of Home Economics, which conducts the Department's investigations on the use of food, fiber, and other home supplies and on the use of family income and does research besides to assist agencies within and without the Department in the war effort, is telling homemakers how to prevent waste and how to make good use of food, home equipment, and clothing. Production efforts, such as the Food for Freedom, Victory-garden, and the Victory Food Special programs, have been rounded out with increased efficiency by educational material on the use of agricultural commodities.

Labor-saving devices in homes lighten the home work load, but war demands on metal and on factory production have practically put a stop to the manufacture of household equipment for the duration. It is important to make home equipment last as long as possible. Accordingly, the Bureau has prepared folders on the use and care of refrigerators, washing machines, and other equipment items. It is studying how closures for jars may be used in home canning with greater economy. In cooperation with the National Bureau of Standards, the Bureau is testing rubber gaskets produced in accordance with specified formulae, so as to develop an emergency standard. The tests will enable WPB to allocate the amount and kind of rubber necessary. Much food will spoil if gaskets do not maintain a tight seal.

Consumers need authoritative, tested information on making rubber goods last. The Bureau has conducted laboratory tests in cooperation with the National Bureau of Standards and issued directions and charts that show ways to care for and repair rubber articles. Heat, sunlight, oil, and grease are enemies of rubber goods.

The Bureau has designed comfortable, safe, and efficient clothing for women engaged in war industries and in farm work. Some of the designs are for garments to wear at outdoor farm chores or in the farm kitchen; others are for garments adapted to industrial jobs. Patterns for 16 of the Government designs are available. Some 75 to 80 clothing manufacturers are reported to be making women's work clothes, either as exact copies or as adaptions of the Federal designs. When silk became scarce the Bureau was ready with about 200 designs for cotton stockings which the trade could use.

Production of women's full-fashioned cotton hose has increased from a negligible quantity in the first part of 1941 to about 10 percent of the total output by July 1942. Long-staple cotton, spun into fine, combed, two-ply yarns, is the material used for highest quality cotton hose. Demand for this type of stocking far exceeds the limited supply. The bottleneck is not want of designs but want of spindles.

Meantime, because there is little fine, combed, two-ply cotton yarn available for this type of women's hosiery, the Bureau has been working toward production of stockings made of single, combed yarns from medium-length staple cottons. Improving the strength, elastic properties, and appearance of cotton hose knit from these yarns is the goal of the experiments. New chemical methods of treating cotton yarns to increase their strength and smoothness are being investigated, and in other tests high twist is applied to the single yarns for strength.

STUDIES OF GOODS FOR CIVILIAN AND WAR USE

Disappearance of some textile fibers from the civilian market and reduction in the supply of others mean increasing use of replacement fibers for clothing and household fabrics. Effects that some of these fibers have on the durability, warmth, and other qualities of certain household textiles have been studied. One study tested three blanket fabrics in hospital service to compare the effects of blending good-quality new wool with poor-quality new wool, or with reused wool or with mohair. On the whole the fabric that contained poor-quality new wool was more satisfactory than that which contained reused wool or mohair. The fabric with a blend of reused wool gave the poorest performance. Both reused wool and mohair are now used to extend our supplies of new wool.

The deterioration of cotton fabrics when attacked by various micro-organisms is a serious problem. Unless chemically treated, cotton fabrics, such as awnings, tents, camouflage nets, tarpaulins, sandbag and seedbag coverings, deteriorate rapidly when used out of doors, in a dust-laden atmosphere, or in direct contact with the ground. Mildew research in the Bureau, conducted cooperatively with other agencies in the Department, has been directed toward the testing of materials for the War and Navy Departments, with special emphasis on methods of protecting fabrics used out of doors against the rotting action of bacteria and fungi.

In late 1941, when it became apparent that the war's effects on income distribution and market offerings would soon greatly change spending and saving patterns, the Bureau undertook a new study of the amounts of goods and services consumed by various income groups. Active support came from the War Production Board, the Office of Price Administration, the National Resources Planning Board, the Treasury Department, the Bureau of the Budget. Funds to supplement the Bureau's resources were granted for an inquiry into the incomes, expenditures, and savings of a representative sample of rural families to show their living situation in 1941 and the first quarter of 1942. The Bureau of Labor Statistics of the United States Department of Labor made an urban survey.

CHANGES IN RURAL SPENDING

The Bureau of Home Economics gathered data in 45 counties in April and May 1942, and in June placed preliminary figures in the hands of Government agencies most concened. The sampling showed significant changes in the spending of rural families since 1935–1936, when the last Nation-wide survey was made. In 1941, farm families put more than twice as much into savings as in the earlier period. They reduced debts, bought defense bonds and stamps, and made other investments. Their outlays for living increased by scarcely a third, although incomes averaged almost 50 percent higher.

How recent trends in food consumption affect nutrition has been studied, and the relative importance indicated of various foods or groups of food as sources of nutrients. This work is providing background information and pointing to ways of dealing with possible food shortages. Results are being brought to the attention of the Nation's Food Requirements Committee, through Departmental committees, and also upon request to the National Research Council's Food and Nutrition Board and the Office of Defense Health and Welfare Services.

FOOD DRYING IN THE HOME

In connection with food drying in the home, a method of preserving food which is gaining increasing attention, the Bureau is telling homemakers how to produce the most palatable and nutritious dried foods. Its investigations indicate that carotene (provitamin A) and vitamin C are the most unstable in home drying of food. Adequate precooking appears to be essential to the retention of carotene, vitamin C, and cooking quality in many vegetables. Preliminary treating and subsequent storing are as important as actual drying in maintaining vitamin content. Storage should be in airtight containers and at low temperatures. There is apparently some loss of minerals in home-dried food, and also in commercially dried food, but the experiments indicate there may be a fair retention of vitamins.

Entomology and Plant Quarantine

Because insects carry diseases, cause much annoyance to man and animals, and damage crops, foods, and fabrics, measures to control them are an important and essential part of the war effort, as well as of our permanent struggle toward a better life and better living conditions. For example, before we got into the war, the Department discovered and published basic information on how insecticides could be distributed by aerosols. More recent intensive research has made it possible, by this means, to develop a new and highly effective method of killing adult mosquitoes. It provides a way, effective even in outlying combat areas, of protecting our troops from malaria. It destroys the disease-carrying mosquitoes in barracks, tents, airplanes, and other enclosed locations. Both the Army and the Navy now use it extensively.

Shortly before Pearl Harbor the Army Medical Corps told the Department's entomologists it had urgent need of a method which could be used in highly mobile warfare to free clothing from living forms of lice. It desired a treatment that could be completed in 30 minutes or less. Drawing on experience and accumulated information, the entomologists met the specifications early in 1942. New conditions, however, brought new requirements, especially for treatment schedules adapted to a wide range of time and temperature conditions. Many of these additional requirements have now been met. What the methods are cannot now be told; but the result is not a military secret. It is a new high level in the protection of our military forces from lice and lice-borne diseases, such as typhus.

Clothing, gloves, head nets, bed nets, and other equipment help to protect troops from many kinds of biting and disease-carrying insects. The Department tests these things for the Army and recommends specifications as to thickness of material, fineness of mesh, and other requirements. It teaches officers of the sanitary and medical units how to identify pestiferous and disease-carrying insects, and participates in other means of training the Medical Corps in insect-control methods. Entomologists visit Army camps and give advice and information on the control of mosquitoes, bedbugs, flies, cockroaches, and other insects. Specialists in the Department have identified thousands of insects in answer to requests from military agencies and at the same time have met the usual yet pressing demands for the identification of pests that affect agriculture and its products.

At the request of the Army, and in cooperation with the Public Health Service, the Bureau of Entomology and Plant Quarantine is carrying out operations to control dog flies in the vicinity of military camps along the Gulf coast. These vicious biting flies can prevent men and animals from doing their work. Control operations based on the Bureau's research have permitted uninterrupted training of gunners

and pilots in areas where the dog flies were previously abundant and extremely annoying.

Entomologists have found ways of preventing or greatly reducing losses from insect damage to cabbages, tomatoes, peas, and other crops important in the war effort. They have published the information, and made it widely available to producers. So that insecticides and other materials may be economized as well as used effectively, the entomologists have urged farmers to time their applications properly, and not to apply too much. Farmers can thus conserve both labor and supplies, and prevent unnecessary wear on equipment. Some materials used for the control of insect pests are scarce or not available and the supplies of others may have to be curtailed. Accordingly the Department has launched investigations to discover effective substitutes and to indicate what changes should be made in standard practices. The results may be important in the farm war effort.

COMPREHENSIVE METHODS NECESSARY

All effective ways of combating insect pests should be followed, not merely some of them. Action against the cotton boll weevil illustrates this principle. This pest, which in an average year destroys 14 of each potential 100 bales of cotton, can be attacked while the cotton is growing and also after the cotton has been harvested. Entomologists in the Department conferred last winter with representatives of State agencies on plans to unify recommendations for the control of the boll weevil and also of other cotton pests.

Subsequently Federal and State officials assembled facts about infestations and aided the insecticide industry in distributing calcium arsenate where it would do the most good. During the harvesting they cooperated with farmers in an effort to reduce the number of weevils that might live through the winter. Cutting the cotton stalks of the year's planting while they are still green is one means. This practice starves weevils that would otherwise survive.

Grasshopper control on southwestern range lands has saved forage for beef cattle. Grasshoppers threatened last spring to destroy valuable range grasses on some 300,000 acres in Arizona. The State provided part of the necessary funds for a control campaign, and the Bureau of Entomology and Plant Quarantine furnished bait and assistance to ranchmen. Aviators baited more than 172,000 acres of range land. This and other methods saved forage throughout the infested area.

Wartime changes in transportation have necessitated changes in procedures to safeguard the importation and movement of materials that may carry insect pests and plant diseases. New aspects of the task are the need for secrecy regarding the movement of commodities, the need for speed in all such operations, and the need to keep docks and freight platforms free. These requirements have an obvious bearing on the application of safeguards against the introduction or artificial movement of pests.

Plant quarantine inspectors endeavor to give the maximum protection possible consistent with keeping transportation channels open.

Special procedures are necessary when ships must enter ports unannounced or disabled. The regulations have been changed to allow the entry, under proper safeguards, of commodities, such as cotton and green lima beans, at southern ports. Normally these may enter only at northern ports.

Entomologists have helped to protect spruce lumber for aircraft, hickory, and ash for gunstocks, and other wood products from insects. They have visited more than 280 defense housing projects to give information on combating termites. Entomological information supplied to architects has enabled them to provide protection from termites and, at the same time, to save critical materials and reduce construction costs.

The need to husband our resources has increased the importance of controlling pests that attack foods, fibers, and supplies of many kinds. Control procedures developed through research have provided means, important among which is skilled inspection of stored supplies. For example we have huge supplies of Australian and South African wool at several centers within the United States. Entomologists inspect them from time to time, point out danger signs, and advise the Defense Supplies Corporation on methods of keeping the wool free from insects. They inspect samples of woolen yarns for the Red Cross and test the adequacy of moth and carpet beetle treatments applied to woolens and fur clothing for the Army.

The War Drain on Our Forests

Tremendous output of forest materials is essential to the war effort. Billions of feet of lumber must be produced to house the expanding American armed forces and the army of workers in war industries. Cantonment construction in 1942, with attendant warehouses, mess halls, and other servicing facilities, called for an estimated 2,200 board feet of lumber per soldier. Housing at industrial plants and the construction of new war plants used great quantities of lumber.

Wood and wood derivatives went into the production of ships, docks, airplanes, gunstocks, explosives, and a host of other war materials and facilities. Some 7 billion board feet of lumber was necessary merely for boxing and crating war materials, agricultural products, and essential civilian goods. Orders for army beds called for many million feet of hardwoods. Requirements of hardwoods for Army-truck bodies exceeded 1 million feet a day. Wood was classed among the critical war materials. The War Production Board issued an order freezing supplies of softwood construction lumber for immediate war uses. Farmers had difficulty in obtaining lumber for grain storage bins. The supply of high-quality timber was short for a number of specialty uses.

Total lumber production in the United States in the first quarter of 1942 decreased as compared with the corresponding quarter of 1941. This drop, with urgent requirements mounting, partly resulted from weather conditions, equipment shortages, transportation and other difficulties. Back of it, nevertheless, was the fact that we had allowed much of our forest land to deteriorate in productivity. Our prolonged destructive liquidation of timber stands had left us without abundant timber accessible throughout the country. We had to draw on the last remaining stands of virgin timber on the west coast, and on the areas of advanced second growth in the South. We had to search out isolated remnants of timber for some of our specialty needs. All this meant long and costly hauls to consuming centers, with transportation facilities already overtaxed. Many of these consuming centers have large areas of forest land nearby, potentially capable of heavy timber production; but these areas produce only a small fraction of what they could.

As the Department has often pointed out, destructive liquidation of our commercial forests is still occurring. Annual drain of our forest resources still exceeds the annual growth. Moreover, wasteful forest liquidation has speeded up with the increased cutting of timber for war purposes. For example, in northern Idaho white pine operations, many of the owners do not intend to hold the lands for permanent timber production. On nearly half of the privately owned white pine land which is being cut over there will be little white pine reproduction and not much usable growth of any kind. In the

Pacific Northwest liquidation processes have speeded up as much as 40 percent. Opportunities for sustained-yield operations essential to the stability of a number of communities are in jeopardy.

High-quality sawlogs have almost disappeared from the Eastern Shore of Maryland. Mine-prop, wood distillation, and pulp industries in Pennsylvania are cutting largely on a clear-cut basis. Serious deficiencies in high-quality forest material are developing throughout the Northeast. Probably 85 percent of the cutting is without regard to future crops, and many areas are becoming so depleted that local woodworking industries will have to be abandoned.

Liquidation of the small remaining supply of old-growth timber is occurring at an increasing rate in the Lake States. There is a material increase in the cut of second growth, especially in 30- to 40-year-old stands in Minnesota, which are just becoming merchantable. In many cases the devastation of these young stands will leave no basis for future timber crops. Further heavy inroads are being made on already depleted stands in Ohio, Indiana, Illinois, and Missouri. Many small mills in the Southeastern States are clear-cutting. Farm woodlands are suffering. Local people who depend on winter forest work for their principal cash income will face very serious hardship in some areas after the war.

Progressive operators in growing numbers are practicing conservation management on their holdings, and their efforts are especially commendable in view of the prevailing high prices and heavy demand for lumber. Encouraging developments are the establishment of "tree farms" by a number of operators in the Northwest, and the conservation program of a large association of pulp and paper operators in the South. Such examples, however, are in the minority. About 80 percent of all the cutting done on private forest lands pays no regard to the maintenance of timber growth. This accelerated destructive forest exploitation is unnecessary and agricultural policy should find ways to stop it. This Department knows of no instance where wasteful and destructive practices are necessary to get wood for war uses.

On the contrary, studies by the Forest Service show, for example, that in the Lake States selective cutting can produce the same volume of lumber with 10 percent less labor than destructive clear cutting. Pulpwood can be cut selectively with at least 8 percent less labor than the usual clear-cutting practices require. Clear cutting in northern hardwoods provides only 27 percent of the cut in the form of the urgently needed yellow birch veneer logs for airplane use. Selective cutting in the same stand will yield 40 percent of the cut in the form desired. The destructive liquidation of forests is sowing seeds of post-war depression.

RECOMMENDED CONSERVATION MEASURES

Conservation measures recommended by this Department include:

1. Public control of cutting and certain other practices on privately owned forest lands so as to assure adherence to standards that will stop forest deterioration and keep the lands in productive condition.

2. Increase public cooperation with private forest-land owners, such as aid in protection against fire, insects, and disease, research and extension aid in meeting forest-land management problems, aid to States in improving methods of forest-land taxation, and development of new uses and markets for forest products.

3. Increased public ownership of forest lands which are submarginal for profitable permanent private enterprise and of lands whereon the public interest is paramount, such as the lands of important watersheds.

The first of these measures, the Department believes, is more than ever necessary now, in view of the accelerated rate of forest deterioration. Public controls should establish the broad standards of forest management and cutting necessary to perpetuate forest growth; local regulations under these minimum standards should be adapted to local needs and conditions. They should be set up and enforced through democratic processes. They should protect the progressive owners who practice sound forestry from the unfair competition of the liquidator. They should provide the "rules of the game" essential to continued free enterprise.

The second group of measures is a necessary corollary of the first, to aid the forest-land owner in meeting the requirements of regulated cutting and to encourage his going beyond them to the practice of real sustained-yield forestry.

The third measure—extension of public ownership—should be a major part of our post-war reconstruction program.

The United States and the world will need wood for the post-war reconstruction. Wood will be in demand for our development and progress. Abundant natural resources are essential to the realization of our ideal of peace and liberty; and abundant forest resources can be developed and maintained only through forest conservation. Let us not ourselves destroy one of the resources we are fighting to protect.

MISCELLANEOUS FOREST SERVICES

Foresters investigated sources of tannin and the possibility of increasing the production. They surveyed the supply and the accessibility of chestnut wood and the number and capacity of tannin extraction plants. They began an investigation of the feasibility of developing commercial tanning production from mangrove bark in Florida. In the Northwest they looked into means of accumulating western hemlock bark as a source of tanning products. Representatives of the Forest Service assisted the War Production Board, the Army Ordnance, and other agencies in wood-requirement or wood-utilization studies. At the request of the Treasury Department, the Forest Service inspected and certified logs procured for lend-lease shipments.

In the last two decades motortruck logging and truck hauling of forest products have come to dominate the field. In view of rubber-tire shortages, the Forest Service made a survey of the dependence of the forest-products industries on motor transport, and of the possibilities for reducing truck use in logging and milling. Four-fifths

of the logs and pulpwood, one-third of the lumber from the mills, and practically all the naval stores produced in the United States move on rubber. More efficient use of trucks, utilization of rail, sledding, and river-driving facilities to the fullest extent practicable, sharing or trading of timber and manufacturing facilities to eliminate cross hauls to mills, and other tire-conservation measures could effect a reduction of as much as 25 percent in rubber needed, so the Forest Service reported to transportation-control authorities.

Naval stores production required in 1942 was 58 percent above 1941 production. Tire shortages and other difficulties made it doubtful whether the requirements could be met. The Department encouraged maximum turpentine and rosin production. Loans by the Farm Security Administration enabled many small farmers in the southern pine belt to enter into the naval stores field, and bring into production stands of timber that had not previously been worked. Experiments with acid stimulation of gum yield led to a promising development. The Southern Forest Experiment Station found that a solution of sulfuric acid applied to freshly chipped slash pine faces increased the yield of gum up to 60 percent or more. Large-scale testing and demonstration of the technique followed. A number of turpentine operators who cooperate in the AAA naval stores conservation program undertook to try out the process on a commercial scale. Effective on slash pine, the treatment did not produce an equal response on longleaf pine. Slash and longleaf pine trees occur intermingled in most southern pine stands worked for naval stores. Experimenters with the acid-stimulation method are now looking for a technique that will be effective both for slash and long-leaf pine. Investigators are studying the propagation of high-yielding strains of pine trees, since individual trees have been found whose yield is several hundred percent above the average of the species.

As part of the program to conserve coal and oil, the Forest Service granted hundreds of permits for fuel-wood cutting in the national forests. It cooperated with the Extension Service in encouraging the accumulation of big wood piles for winter use on the farm, and farm cutting to meet the needs of local communities. There is a shortage of professional wood cutters, particularly in New England, so it will be up to individual farmers to meet most of the demand. 4–H Clubs and other groups in some of the New England States organized Cut a Cord for Victory campaigns. Fuel wood is still an important forest product; it accounts for about 30 percent of the estimated total commodity drain from the Nation's forests. Much of this comes from wasteful farm-woods cutting. Billions of feet of high-quality timber have gone up in smoke. Properly directed, however, fuel-wood cutting can serve actually to improve the timber-producing capacity and value of woodlands.

Available supplies of Sitka spruce of airplane quality in the Pacific Northwest are insufficient. Looking to additional sources, the Forest Service surveyed the possibilities of drawing on the spruce stands of the Tongass National Forest of southeastern Alaska. Subsequently the Secretary approved an agreement between the Commodity Credit Corporation and the Forest Service under which the latter, as the

Corporation's agent, will undertake a large-scale enterprise for the production of Alaskan timber. This new source should help greatly in meeting the demand for airplane spruce. It takes a great number of logs to meet the need, because only a small percentage yields lumber of proper quality. As a production goal, the Forest Service has set 100 million feet of high-grade logs per year from Alaska for the duration.

Representatives of the Nation's principal manufacturers gathered at the Forest Products Laboratory in Madison, Wis., in August 1941, to discuss research on the use of wood in airplane construction. Since then the industry has obtained data from the Forest Service on aircraft designs; the use of wood in airplane parts; the cutting, selection, and seasoning of wood; the evalution of glues; the gluing of plywood and solid wood; the buckling of plywood; nail gluing; process specifications of woods for aircraft use; and other wood problems of interest and importance.

Research in the Forest Products Laboratory has indicated an increasing number of war uses for Compreg, a new material formed by the compression and impregnation of wood with phenolic resins. Compreg has been developed for use in spar plates, in propellers, and in landing wheels of airplanes; for parts of torpedo boats and other naval auxiliary units; and for other uses. In a highly compressed state it has strength properties comparable to those of mild steel. The laboratory has also developed a paper plastic for possible use in aircraft construction. Experiments indicate that this plastic approaches steel in tensile strength.

CONTAINER PROBLEMS

Another major wartime activity of the Forest Service has to do with boxing and crating. It covers packaging, loading, and shipping problems for all sorts of war materials from tanks to cheese. Funds allotted by the War Department have enabled the Forest Products Laboratory to expand its work on shipping-container problems. For the Army Ordnance Department the Laboratory has revised and redesigned boxes and crates for the shipment of Army material. It has assigned members of its "container" staff as field consultants to Army arsenals, warehouses, supply depots, proving grounds, and shipping ports. It has helped to prepare estimates of packaging requirements for agricultural commodities. It has designed lightweight and compact containers for air transport, and developed a new more efficient method of crating motors. It has worked on time-, space-, and money-saving methods of packaging cheese, eggs, condensed milk, and other foods.

The Forest Service has investigated domestic sources of cork or corklike materials to replace the cork formerly imported from Mediterranean countries, and found methods of separating corky tissue from the bark of native Douglas-fir. From material collected in the Rocky Mountain region it has obtained yields of almost pure granular cork which run as high as 43 percent. Research has developed a new type of interior paint which checks the spread of flames in wood con-

struction. It has obtained substances from wood lignin which improve the antiknock properties of gasoline more than some of the materials now in use. In cooperation with a manufacturer, the Forest Service has adapted a wood plastic for storage-battery cases and tops as a substitute for hard rubber.

AERIAL SURVEYS

Aerial survey and topographic mapping for the Army Corps of Engineers enlist facilities of the Forest Service. Networks of forest lookout stations are a link in the Army's aircraft-warning system. The Forest Service cooperates in aircraft-detection tests and in the development of air-raid defense plans. Lookout stations, manned 24 hours a day by trained observers, function in the aircraft-warning system. Communication facilities of the Forest Service are ready for instant integration with military communication systems should the need arise. The Forest Service has the responsibility, under the Facility Security Program established by Executive order in May 1942, of developing measures necessary to protect timber and forest-products facilities from sabotage or wartime fire hazards. It has assigned men to survey and inspect some 6,500 forest-products plants and operations, as part of a program undertaken in cooperation with the Office of Civilian Defense and other agencies.

PRODUCTION IN NATIONAL FORESTS

The national forests help to provide meat, wool, and hides for ourselves and our allies. Range lands within the western national forests play a key part in the western livestock industry; normally they furnish seasonal grazing for more than 10 million head of cattle and sheep. Livestock operations which represent an aggregate ranch investment of more than $300,000,000 depend upon the seasonal use of national-forest range. Many of the mines that produce essential metals for the war effort, and many undeveloped deposits of strategic metals, are within the national forests. The Forest Service has made surveys of needed access roads; it is constructing a number of roads to open deposits of chrome, tungsten, and other important metals. Timber from the national forests is aiding the war effort. The cut in fiscal 1942 was about 2,200,000,000 board feet as compared with 1,290,623,000 in fiscal 1939. Several hundred thousand acres of national-forest land have been transferred to the War and Navy Departments or made available through cooperative agreements for military reservations, artillery ranges, maneuver areas, proving grounds, etc.

DANGER FROM FOREST FIRES

In wartime the Nation faces greater danger from forest fires than ever before. Forest fires must be held down so as to avoid the disorganization of industries and of transport and communications, and also to obviate the diversion of manpower to unproductive fire fighting. Moreover, forest-fire control is important because smoke palls from fires could screen enemy attacks or interfere with our military opera-

tions. The Secretary of War and the Western Defense Command have emphasized the military importance of forest-fire control.

The call to arms and to war industries, and the reduction of the Civilian Conservation Corps, have depleted the regular fire-control forces of the Forest Service and the State forest-protection agencies. It has become necessary for these agencies to rely largely on volunteer help. The response in all regions has been gratifying. Farmers and ranchers, urban people, and members of mountaineering clubs, labor unions, and veterans' organizations have offered their services on call. The Office of Civilian Defense has cooperated in establishing a Nation-wide Forest Fire Fighters Service, and in recruiting volunteers. This national auxiliary force provides an over-all, coordinated set-up for local fire-fighting groups. Also the OCD has made the personnel and aircraft of the Civilian Air Patrol available for forest-protection service through a cooperative agreement with the Forest Service. The Congress has appropriated emergency fire-control funds. Organized protection has been intensified in the most critical areas.

Adequate manpower and facilities would be able to stop practically all forest fires before they reached damaging size. Forest-protection forces, however, are as yet very thinly spread. More than one-fourth of the country's total forest area still lacks permanent organized protection. Fires flared in the forests of New England and in those of the southern Appalachians last spring, some of them of incendiary origin. In high-hazard areas during the season of greatest danger the emergency closure of portions of the national forests has been necessary. Annual losses from forest fires, with stoppages of industry and employment, the destruction of resources, the loss of wildlife and scenic values, and aftermaths of floods and erosion run to many millions of dollars. Abatement of the loss must await the provision of more adequate facilities.

Farm Security Programs

The Farm Security Administration, which has been helping as many small farmers as it could reach with the funds available to improve their resources and productive ability, was able to gear its program quickly into the Department of Agriculture's Food for Freedom drive and into the national mobilization of material resources and manpower for total war.

Putting the Farm Security program on a war footing required only an increased emphasis on food production—rehabilitation of low-income farm families remaining an important though subordinate FSA objective. As the FSA borrowers produced meat, milk, eggs, fruits, and vegetables for the war effort, they improved their own condition.

To many farm families whom it had not been possible to include in the standard rehabilitation loan program FSA made available a Food for Freedom loan with a $500 limit. This loan enabled many low-income, underemployed farm families to buy tools, seed, cows, sows, and chickens. It helped them to increase their garden, feed crop, milk, pork, and egg production, and where possible to grow flax, peanuts, soybeans, and other important war crops. New operating goods loans were made to 90,000 families in all in the fiscal year 1942. Supplemental loans were provided for 260,000 borrowers previously active in the rehabilitation program. These farmers, and 120,000 other rehabilitation borrowers who operated with FSA guidance but did not need additional loans in fiscal 1942, added considerably to their production of food and fiber.

But what has been accomplished is only a start in the right direction. Only about one-fifth of the Nation's low-income farmers are active rehabilitation or Food for Freedom FSA borrowers. The Department believes that to obtain all the food and fiber needed the Nation will have to depend increasingly on the small farmers. Large-scale operators have more and more difficulty in raising their production owing to shortages of machinery, equipment, and skilled labor. Some big farmers, as a result of the shortage of capable help, produced less in 1942 than they did in 1941. As shown in more detail in other sections of this report, on the small farm there is no labor shortage. Frequently, however, the small farm is short of seed, fertilizer, machinery, and other means of production which small loans could supply.

The 1940 United States Census showed that the average bona fide farmer with an annual gross income of less than $800 produced less than $500 worth of farm products for sale, trade, or home use. This group numbered about 2,412,000 farmers. In the South, the average family-type farmer could have produced that much gross income from only 8½ acres of cotton and a small garden. So small a production

would have employed only half his time and that of his family. In the Midwest, this $500 gross income could come from 2 cows, 20 pigs, 50 hens, and a garden. There are half a million families in the Midwest with small farms which employ their labor only partially. In fact the low-income and underemployment situation on our farms has not changed much since 1939. Better farm prices have meant little to the small farmer who takes only a few hundred dollars' worth of products to market. But to expand his production he needs help.

Surveys made at the end of 1941, which covered 343,000 families who had completed at least 1 year as standard rehabilitation borrowers, disclosed that between the year the families came on the FSA program and 1941 the annual value of home-used production per family increased from $163 to $327, or 101 percent. These families increased their annual net incomes an average of 80 percent, from $480 to $865, and their net worth an average of 43 percent, from $871 to $1,242. They increased the amount of fruits and vegetables canned by 114 percent (from 139 quarts in the year before they got loans to 297 quarts per family in 1941). They enlarged their milk production for home use from 288 to 472 gallons, or about 64 percent, and increased their meat production for home use from 252 to 488 pounds, or 94 percent. They stored per family last year 27 bushels of fruits and vegetables and produced and used per family 131 dozen eggs and 10 gallons of lard. So it is evident that substantial food production is possible on the ordinary small farm. Some of it can be marketed.

VARIOUS FSA PROGRAMS

Cooperative activities became more important during the year in the production efforts of small-farm operators. Members of cooperatives organized with FSA help met the equipment-shortage problem, and reduced their operating costs besides, through group ownership and use of machinery and equipment, such as tractors, combine harvesters, cotton gins, fertilizer and lime spreaders, spraying tools, sawmills, feed grinders, hay balers, mowers, and flax pullers. In most cases, the machinery or equipment bought and shared by a group of farmers was too expensive for the members to own individually. Purebred sire rings, established with FSA aid, multiplied considerably. More than 20,000 machinery, equipment, and purebred sire cooperatives are now functioning throughout the country with FSA assistance. Thousands of farmers have been helped by FSA loans to become members of cooperative organizations already well established in their communities, and FSA farm families have banded together into purchasing and marketing associations to make group purchases of farm and home supplies and to set up marketing facilities for their products, where such services were not available.

By the end of June 1942, 29,000 tenant farmers had been converted into farm owners through loans made by Farm Security under terms of the Bankhead-Jones Farm Tenant Act of 1937. The loans, averaging $5,570 and based on farm-earning capacity, are repayable in 40 years at 3 percent interest. The security of tenure thus achieved by these farmers, and their ability to carry out farm and home plans for home production of family food needs, diversification of crops

and conservation of the soil, make them effective in the Nation's agricultural army.

Migratory-labor camps, established by FSA in a time of labor surplus to provide minimum housing, sanitary, and health facilities in specialty-crop areas for farm laborers, and their families, are now helping to alleviate the farm-labor shortage. Where the camps are in operation, the shortage is proving to be less acute. The camps are an inducement to workers to enter the areas served. Emphasis this year has been on the establishment of mobile-type camps, which can be moved easily and quickly. Of the 37 new camps built during 1941–42, 27 are mobile camps, 6 are standard camps, and the other 4 are of a new light type designed for areas with a 6 months' harvest season where it is not feasible, as it is in the standard camp areas, to maintain camps in operation the year round. Some 19,232 families can now be accommodated at any one time in 94 camps for migratory labor. These camps are operating in 18 States.

Assigned to each camp site under a cooperative agreement between Farm Security and the United States Employment Service is a farm-placement supervisor. He recruits migratory workers and routes them to farms.

The Army's Western Defense and Fourth Command last spring assigned to FSA the task of finding operators for the evacuated farms of Japanese aliens and Japanese-Americans. Nearly half the Japanese working population evacuated from the Pacific coast had been engaged in agriculture—7,000 were farm operators; 13,000 were farm laborers. The Japanese in California accounted for about 35 percent of the State's vegetable production and this in turn ranged from one-third to two-thirds of the Nation's production, depending on the crops. By June 1942, FSA had negotiated the transfer of most of the Japanese-controlled farms to other West coast operators. It had loaned a total of $3,132,372 to 728 qualified applicants for the vacated holdings. These were applicants who had not been able to obtain credit from other sources.

EMERGENCY GRANTS

Farm families affected by crop failure, flood damage, or other adversity received FSA grants as in former years. Such grants, coupled with work agreements and arrangements for improved land tenure, provided for emergency subsistence needs and medical attention for the distressed farm families and contributed to their future stability. The grant program also served a special war-emergency purpose. It assisted farm families displaced from land taken over by the military authorities for cantonments, maneuver areas, and munitions plants. Landlords received payment for the land converted to military uses; but tenants, who were in the majority, had to bear the costs of their displacement themselves, except for such grant assistance as Farm Security could provide. It helped some of the displaced families to find other farms and made operating loans to them for a new start. Owners and tenants, who had to move on short notice and at inconvenient times, often lacked ready cash or credit and were unable with-

out assistance to find other farm homes in face of a suddenly inflated local demand for land. Through loans made to nonprofit relocation associations FSA provided means to option and buy farm land on which these families could relocate, and which they could buy on reasonable terms.

During the 1942 appropriation hearings, however, the question was raised as to the authority of the Farm Security Administration to make loans to be used in acquiring farm land in this manner. The Comptroller General subsequently ruled that rehabilitation loan funds could not be so used. Accordingly the Farm Security Administration ceased the disbursements. However, the emergency need created by this family displacement continues. In fact it is increasing. Thousands of farm families will be unable to continue their farm operations and will also find it difficult to reestablish their homes if some means to assist them is not made available.

Rural Electrification

Electricity is essential to national defense and to the war effort. Every kilowatt-hour must make its contribution. Electricity has proved its worth in agricultural processes and in the farm home; wisely used it can increase our supplies of the things we most need. Hence the Department believes the Rural Electrification Administration's requirements for power and materials should be supplied so long as they do not conflict with more vital war requirements. On many electrified farms a supply of electric power is essential to speed up production. It is not possible, however, to carry on our full REA program.

Farmers on REA lines have an obligation to use their electricity wisely and carefully. Farm uses of electricity that increase productivity or prevent waste of food should be continued and sometimes increased. On the other hand, uses which are merely for comfort or display and which add nothing to the farm production effort usually cannot be justified at present. These are the guidelines which the REA has followed. By choice and by necessity, it has tapered off its normal program as rapidly as possible and adopted a wartime program instead.

Line construction and extension activities have been geared to meet the requirements and limitations generally imposed on all electrical construction by Preference Rating Order P–46 of the War Production Board. At the end of fiscal 1942, new electrical facilities were being built only to meet direct military, naval, and war plant requirements.

Besides helping on the food front, this wartime program is facilitating the use for war production of rural shops and plants which are capable of producing small parts for munitions. It is providing an inducement for other plants to locate in rural areas. In this way REA lines have helped to avert greater crowding of already crowded cities. In January 1942, 700 REA-financed power systems (which reported, out of 778 to which a questionnaire had been sent) showed that REA power was being supplied to 56 machine and blacksmith shops, 59 sawmills, 32 railroads, 133 oil services, 14 lumber camps, and 116 mines, among them 90 coal mines, 12 mercury mines, 2 vanadium mines and mills, 2 lead and zinc mines, and 7 fluorspar mines. Other industries that were using REA power included turpentine plants, welding plants, iron works, tung-oil plants, asphalt plants, and coal docks.

Food processing was benefiting from REA installations. REA power was supplying 474 dairies, 148 cheese factories, 68 creameries, 25 food-packing plants, 44 cold-storage plants; also numerous dehydrator plants, potato sheds, sausage factories, sugar refineries, packing houses, flour mills, and beet dumps. Altogether 840 plants were processing food with REA power. The survey showed also that REA power was

being supplied to 50 aviation bases and training schools; 8 Army, Navy, and Marine camps and bases; 2 ammunition depots; 7 radio stations; 2 locks and dams; 138 radio beams and beacons; 3 lighthouses; and 37 defense housing projects. The reported industrial load totaled 14,856 services, as compared with 5,365 shown in a similar survey taken a year earlier.

FOOD IS CHIEF REA OBJECTIVE

Food, however, is the chief concern of REA-financed power systems. What electricity can do toward increased farm production has been measured in some lines. For example, an automatic supply of water in the cow barn will bring an increase in production of 8 to 15 percent of milk, or 5 to 10 percent of butterfat. In the poultry house a constant supply of water will increase egg production 8 to 10 percent. Electric cooling reduces milk losses and egg losses during the summer months. Electric heat used in the incubator, because it can be accurately controlled, produces a 20 to 30 percent better hatch. Electrically heated brooders, partly because they involve no fire hazard, consume no oxygen, and give off no fumes, decrease the mortality of chickens, turkeys, and other young livestock. Electric heating of stables and pens reduces losses of lambs and pigs during cold, rainy weather. Installed in water troughs an inexpensive water heater will prevent periodic drops in livestock and poultry production, increase the annual egg production by 12 to 15 eggs per hen, and increase the annual milk production by 10 to 15 percent. Good lighting lengthens the day and increases the production in the poultry house.

Electricity also saves labor on the farm. For example, the automatic water-pressure system in a 50-cow dairy barn will save from 3 to 5 man-hours a day of labor time. In the poultry house such a system will save 2 man-hours of labor a day in pumping and carrying water for 1,000 laying hens. The electric milk cooler saves from 1 to 2 hours of labor per 1,000 pounds of milk; the electric milking machine saves 300 man-hours of labor per month for every 50 cows milked.

Electricity makes the farm home more self-sufficient. Electric water-pumping facilities enable farmers to get more produce from small gardens, and to grow an abundance of vegetables for their own use. Electric food-preserving equipment, in some cases owned cooperatively in community centers, reduces the demand for supplies that tax overburdened transportation facilities, and releases commercially canned food for shipment.

Scarcity of materials and the decision to proceed only with essential projects limited REA line construction during fiscal 1942. The total allotted for construction was $91,292,000. This sum included allotments for new line construction, for the development of essential generating and transmission facilities, for acquisitions, for extensions to farms adjacent to existing lines, and (previous to WPB restrictions) for house wiring, plumbing, and other installations. These brought the total allotted by the REA during the 7 years of its existence to $460,180,345.

LINES IN OPERATION

At the close of fiscal 1942 the number of borrowers was 874, of which 798 were cooperatives. They operated a total of 369,129 miles of energized lines, and served 981,193 consumers, who in fiscal 1942 used 1,030,517,456 kilowatt-hours of energy. On their Federal loans, these borrowers had paid back $13,064,030 in interest and $11,189,899 in accordance with amortization schedules. Moreover, 378 borrowers had made advance payments, which aggregated $5,404,428. On the other hand, the total delinquency, which involved 111 cooperatives, was only $183,347 for both interest and principal. Altogether the collections exceeded the amount due by more than 20 percent.

More than 4 million farms in America still remain to be served with electrical energy. The Rural Electrification Act empowers the Administrator to make "studies, investigations, and reports concerning the conditions and progress of electrification of rural areas . . . ," and a method has been developed for making necessary surveys. The results will be available for post-war work. Loan applications on hand at the end of fiscal 1942 exceeded $100,000,000. They called for 120,000 miles of rural lines to serve 250,000 consumers.

Personnel Administration

The outbreak of war demanded total mobilization of the resources of the Department. It necessitated readjustment of its most important resource—employees. The Office of Personnel assisted in facilitating full utilization of the human resources of energy, initiative, and intelligence available to the Department.

Administrators recognized that if the Department was to work at the maximum of its potential productiveness there must be a sound organization of activities of the various agencies and an increase of individual output.

In order to promote more effective action and coordinated effort, the Secretary on December 13, 1 week after Pearl Harbor, announced that the 17 line agencies of the Department were to be grouped under 8 administrators. Continuous adjustment of organization and personnel was necessary in giving effect to this reorganization. This was particularly true in the Agricultural Marketing Administration, in the Agricultural Research Administration, and in the Agricultural Conservation and Adjustment Administration. These include a number of previously independent agencies.

But the establishment of the eight administrations was only the most apparent sign of numerous organization changes at all levels of the Department. The Office of Personnel assisted in adjusting organization structure, lines of authority and responsibility, flow of work, work-load distribution, and the study of employee attitudes, in order to promote job satisfaction and increase employee productivity.

A special problem was the continued influx of new employees into other war agencies in Washington. This influx increased the pressure for geographic decentralization. Although the Department had long followed a policy of decentralization, which had put 85 percent of its employees in the field, further decentralization was accomplished during the year. A large part of the Washington staffs of the Farm Security Administration, Rural Electrification Administration, and Farm Credit Administration were moved out of Washington. In addition, a number of divisions and sections of other agencies were decentralized.

Internally the war effort demanded more streamlined procedures for all types of personnel actions. Important changes, such as the delegation of appointment authority to the field and centralization of all negotiations for release of employees by transfer to and from other agencies of the Government, were made during the year in order to speed up the personnel process.

The Department was faced with a dual problem in relation to the increased shortage of competent personnel necessary to carry on the total war effort. On the one hand, the Department was considered a reservoir of trained executive, administrative, and technical per-

sonnel on which other war agencies continually drew as a means of quickly and adequately staffing their rapidly expanding programs. On the other hand, the Food for Freedom program and the special work performed at the request of other war agencies placed additional burdens on the employees of the Department.

THE DEPARTMENT'S RECRUITMENT PROBLEM

During the year the Department supplied 15,663 workers to other phases of the war effort, 7,333 were transferred to other war agencies, and an additional 3,333 were released to private industry. Some 5,000 Department employees entered the armed forces. This mass movement of personnel emphasized for the Department the manpower problem which had developed in the country as a whole.

One way of meeting this shortage was through increased employee productiveness. A systematic program to utilize employee suggestions and remove employee grievances was developed. As much as a 25-percent increase in production is believed possible through the removal of such grievances and through the utilization of employee suggestions for the improvement of production. The Department undertook a systematic checkup of conditions which affect the production of its employees. As the factors that hinder output come to light, positive steps will be taken to overcome them.

Another means of meeting the shortage of manpower was through the development of latent skills and abilities of employees. Training employees to replace those who were inducted into the armed forces or transferred to other war work received increased emphasis. Adequate training enabled the new employees to get into production in the shortest possible time. It also assisted the older employee in assuming new responsibility of a supervisory or technical nature. As part of the Department's preservice training program to meet wartime personnel needs, it assisted State colleges and universities in the redirection of their educational programs.

The shortage of manpower has changed both the source and the method of recruitment for the Department. The problem is no longer one of more men than jobs, but rather of more jobs than men. As a result the Department is not only doing more direct positive recruiting than ever before but it is also looking to sources of labor supply which in the past were not fully utilized.

Although the Office of Personnel can help to mobilize manpower, the ultimate responsibility for the effectiveness of the Department's war effort rests on each employee. Each, as a citizen in a democracy, has the responsibility to participate in the process of government. As a citizen-employee of a Government agency, he has the responsibility both to do his best as an individual and to suggest changes which will improve the Department's effectiveness in general.

Civilian Conservation Camps

After a productive and useful life of 9 years and 3 months, the Civilian Conservation Corps came to an end on June 30, 1942. The Congress on that date gave the Corps 1 year and an appropriation of 8 million dollars with which to wind up its affairs.

In the first half of fiscal 1942 this Department, through five of its cooperating bureaus, carried on a wide variety of conservation jobs through the Civilian Conservation Corps. In the second half, however, the number of CCC camps, the number of cooperating bureaus, and the work projects had to be curtailed. Two causes were mainly operative. First, because of demands for labor of all kinds, the number of enrollees dropped off materially; and second, demands increased for CCC labor on military reservations.

Emphasis in the CCC began to be focused in 1941 on types of work which would aid the national defense. On July 1, 1941, the Department had 820 CCC camps under its general supervision. This number included 28 former agriculture camps which had been assigned to work on military reservations. By January 1, 1942, the number of CCC camps under the Department's supervision had dropped to 579, and 32 of them were assigned to military reservations. By July 1, 1942, the Department was supervising only 232 camps, of which number 92 had then been turned over to military-reservation work. Broadly, during the fiscal year the scope of CCC work centered in 2 main activities—national defense work on military reservations, and the protection of forests and other basic natural resources from fire.

CAMPS PROMOTED WAR WORK

Assigning CCC camps to military reservations promoted essential war work. It allowed soldiers of the new Army to do more battle training. Simultaneously, the CCC youths received training which helped to fit them either for jobs in war industries or to enter the armed forces. Camps assigned to military reservations carried with them their civilian superintendents, foremen, and technicians, and their work was largely that of contractors. Army officers planned the work and the CCC did it. The CCC camps retained their separateness and looked after their own housing, feeding, and supply system generally. They did not merge with the soldier camps. All told, as of July 1, 1942, 154 CCC camps were assigned or approved for work on 100 different military reservations in 33 States.

The reduction in CCC camps cut deeply into the work of the Department, especially into that of the Forest Service and the Soil Conservation Service. From 455 camps assigned on July 1, 1941, to Forest Service (national, State, and private forests) and the Tennessee Valley Authority, the total had shrunk by July 1, 1942, to 97.

Camps assigned to the Tennessee Valley Authority had been cut from 15 to 4. The Soil Conservation Service at the beginning of the fiscal year had 331 camps; at the end of the fiscal year it had 46. Four camps engaged in work for the Bureaus of Plant Industry and Animal Industry had been closed; 3 camps at Beltsville had been cut to 1. This Department made the largest contribution of CCC camps for work on military reservations, but the Department of the Interior made proportionate reductions.

What has the CCC boy as an individual and the CCC given to the country? Young, untrained, sometimes undisciplined and often from underprivileged families, often undernourished, the CCC boy came at an average age of 20 into an entirely new world. It was a world of orderliness, of schedules, of 8 hours daily outdoor work 5 days each week, of plentiful plain food, of comfortable beds, and of baths. The enrollee learned how to use hand tools and machines; how to mix with his fellows; how to manage the give and take of life. He had a job to do; a foreman to teach him how to do it; a responsibility which he learned to carry. He took pride in a job well done and gained self-confidence. He put on weight and muscle and acquired skills of hand and brain.

When he left the camp he was a man, ready and capable of doing a man's work, with skill and experience gained in daily practice. Thousands of employers have been glad to take on the youth with CCC experience. He could get and hold a job in a war industry or if drafted could fit readily into the Nation's armed forces, far better prepared indeed for a noncommissioned-officer job than the youth without CCC experience. Both Army and Navy officers have testified repeatedly to that.

The CCC youths found a Nation whose natural resources had been abused and wasted. They did conservation work on resources of soil, forest, water, and wildlife which had been crying for help. They put their labor with shovels and other tools for over 9 years to the task of saving America. Their contribution was invaluable. It improved old forests and created new ones, saved millions of acres of soil from washing away, restored old parks and built new ones, gave wildlife a new charter. It made this country a better place to live in and more worth defending. Boys who worked in the CCC camps have a stake in the forests, the waters, and the soils of this country which no one can take away from them, and which at the same time the Nation shares.

Post-War Planning

Still scarred by distresses that came as aftermath of World War I, agriculture in the United States has a vital interest in securing orderly adjustments to peacetime operations.

In World War I, great demands were made for agricultural commodities. Those demands were met, but not in an orderly manner, with a view toward a permanent agriculture. Demands for wheat were met by plowing up vast stretches of grassland that later became dustbowls. Demands for lumber were met by denuding great forest areas.

The transition from war to peace, moreover, was not planned with the best interests of our farm people in mind. As soon as war demands for farm products ceased, agricultural depression set in, with foreclosures on lands of inflated value, unemployment for farm laborers, closed lumber mills, and ruinous prices for agricultural commodities. After 1929 came world-wide depression, with general unemployment and drastic further reduction in the demand for farm products. Agricultural adjustment programs, begun after 1933, revived agriculture and made it once more a vigorous part of our economy.

Agriculture's present position differs from its position in World War I. Long strides have been made in planning for needed supplies of food and fiber. As a result, agriculture is better equipped than ever before to meet the large-scale requirements of war. Using tools developed in the last decade, it is boosting the production of some commodities, and decreasing the production of others. Meantime, the Government supports prices at fair and reasonable levels and insures orderly marketing.

Programs for adjusting agricultural production to domestic and foreign needs are a development of the last decade. Post-war planning, in the main, must be a projection of these programs. It requires an attempt to foresee post-war conditions at home and abroad.

In order to win the war, we are marshaling all our resources and manpower. We are planning the use of each hour of labor, each item of raw material, and each unit of production in a definite relationship to the entire war effort. Teamwork is the basic principle. This Department is organizing the production of food for our own armed forces, for the United Nations' fighters, and for the civilian population of these nations. It is cooperating with other war agencies.

In doing the war job the National Government is affecting the lives and work of all our people. It is providing markets for about half our farm and factory output. Raw materials, finished goods, exports and imports, prices, transportation, communication, and other goods and services are controlled by the Government and directed into channels that will best serve war purposes.

Activities of such scope cannot be abandoned overnight with the coming of peace. Our shift from war to peace activities must be

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gradual. Industries will need time to retool, armies will need time to demobilize, and nonwar employment will need time to get up steam. Hence the shift must be planned segment by segment and need by need. Furthermore, we must not think of it as simply a return to prewar conditions and ways of doing business. Adjustments must be adapted to permanently changed needs, domestic and international.

Some of the broad outlines of post-war conditions are discernible; we must plan within that framework, with allowance for flexibility to meet the unforeseen. We must take into account what the war is doing to our agriculture. Sound planning for the peace can help to win the war; for it will remove doubts and fears about the future and release energies for action now.

REQUIREMENTS FOR AGRICULTURE

Plans for agriculture in the post-war period depend upon the continuation of policies and programs for adjusting production to consumption, maintaining soil and forest resources, supporting prices to farmers, and assuring nonfarm employment. Our whole Nation must be determined to develop such plans. Farmers must cooperate in the planning with other groups.

Unless we maintain full employment, we cannot expect an adequate standard of living for all our people, and farmers cannot expect good prices. If farm prices are not supported by the Government, farmers again will be left to the mercy of freely fluctuating markets. Whatever the demand for farm commodities, we must adjust production to consumption, for it would be unwise even with governmental price supports to produce more than we can consume and export.

Spurred by the Food for Freedom drive, wartime agricultural production is expanding greatly. Production goals for 1943 envision export of products from more than 26 million acres, as compared with 18 million acres in 1934–35; more production is required also for use at home. What shall we do with this productive capacity after the war? Shall we keep it at the present level, to assure adequate food for all our people and for export markets; or shall we return to the partial use of our productive facilities? If we keep the production at a high level, how shall we obtain the necessary markets, both at home and abroad?

Long-time need for the larger production is apparent. The war is showing up ugly facts about nutrition in the United States, especially health deficiencies among men of draft age. If our population grows to 150 million by 1960, we may need the products of an additional 40 million acres to feed it properly. Moreover, we may need more farm products for industrial uses. In short, we have both the need and the opportunity for a better use of our productive land.

Our plans must take account of world needs, especially during the reconstruction period. The people of war-torn nations must be fed. Not yet can we foresee the shape of post-war trade relations or the volume of foreign trade we can expect to have on a permanent basis; but we know that food from the farms of the United States will be important in determining the shape of the peace and in facilitating democratic reconstruction.

IMMEDIATE POST WAR NEEDS

Immediately after the war we may be feeding more people than now. Millions in the occupied countries of Europe and other parts of the world will be hungry and looking to us for food. We may even need to send them new breeding stock to rebuild their herds of dairy and meat animals. Our wartime programs will put us in a good position to meet these peacetime needs. When the war ends our agriculture plant will be geared for huge production, especially of the foods that ship well and keep well, and pack the most food value into the smallest space—such foods as meats and cheese, dried milk, dried eggs, and dried vegetables. The job of bringing our men home, and of shipping out industrial goods, and other farm products, such as cotton, will keep cargo space crowded. I believe we need not fear a sudden drop of farm exports as soon as the war ends and we shall have a large potential domestic demand for farm products backed by the people's accumulated buying power.

To reach the production goals for national and international demands, we must learn how many farms and farm people we need and what those farms and people will require for a decent future. The number of farms will depend materially on what kind of farms we have. American agriculture has long held to the ideal of the family farm. Family farms, however, have become bigger; tractors have caused a consolidation of farms, with much displacement of families on small units. Scientific research may further improve the yields of crops and affect the size of farms and types of farming.

We must conserve land resources on the scale necessary. Proper care and management of cropland, pastures, ranges, forests, watersheds, and irrigation facilities will yield better returns. Prevention of erosion and soil losses, conservation of water, revegetation, drainage, fencing, stream-bank improvement, crop rotation, flood control, and retirement of submarginal land must come into wider use.

PRICES AND EMPLOYMENT AFTER THE WAR

It will be essential for the Government to insure orderly marketing and fair prices, and farmers must know that the Government intends to do so. Estimates of expected consumption requirements and of the production necessary to meet them must be carefully made. Farmers must have advance notice of contemplated post-war policies.

Post-war employment conditions, both in agriculture and industry, are factors to be considered. Changing war jobs to peace jobs, demobilizing men in the armed forces and in war plants, and assuring a smooth shift to peacetime production are tremendous tasks. How can we do them smoothly? Not all of the requirements can be foreseen; but if we know some of them, we can keep busy during the transition.

DETAILED INFORMATION NEEDED

Agriculture is interested also in building up and conserving human resources. Sickly and ignorant farmers cannot produce effectively,

or care for the soil properly; nor do they make the best citizens. We must devise programs to provide medical care, adequate housing, sanitary facilities, and education. We must encourage the development of cooperative action among farmers. We must learn ways to extend electrification, telephone service, and rural roads. In the post-war period America may also assist other countries to achieve a higher level of living for rural people. We cannot now foresee the many ways in which we can help them. But we can and must determine now what it takes to provide services and facilities for the rural people of America.

Secretary of Agriculture.